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Developing a Supplier Risk Identification Tool for a Technology Company

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Writing this thesis has been quite an experience. I feel grateful that I have been able to get all the guidance I asked for during the project in the beautiful Metropolia Bulevardi campus and that I have been provided with the program GATE model that kept me writing my thesis even when it felt impossible. Special thanks go to my thesis instructors, DSc (Tech) Juha Haimala and DSc (Tech) Satu Teerikangas, who guided me in the right direction when my work was drifting and trying to find its course. I am sorry you had to read the earlier versions.

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<p>This thesis studies supplier risk identification and evaluation in the case company context. The case company is a rapidly growing new organization that does not have all its processes defined on a detailed level. Structured ways of identifying, evaluating and documenting supplier risks in procurement are missing and consequences can be catastrophic. Revenue might be lost through delayed customer deliveries or the reputation of the company can be ruined for good.</p> <p>The current state of the case company supplier risk identification is studied by making observations, reading internal documents and conducting interviews to understand the strengths and weaknesses of current operations. Existing knowledge from e.g. handbooks, journal articles and whitepapers is explored based on the identified strengths and weaknesses. The findings from the Current State Analysis and existing knowledge are used to create a Conceptual Framework and the proposal is then co-created with the case company employees by presenting the findings of the earlier phases to them. The final proposal is validated with the case company key stakeholder.</p> <p>To raise the case company risk management to the next level this thesis develops a simple, easy-to-use Excel-tool to be used by the sourcing department for supplier risk identification, evaluation and documentation. The outcome of the thesis is a risk identification tool the case company employees can customize to fit their needs. Employees, who are experts of their respective fields, can determine the risks belonging to each predefined risk category and weigh these risks based on how relevant they are for the case company. This way the tool helps the case company sourcing find the correct issues to focus their attention to when suppliers need to be engaged with.</p>	
Keywords	Supplier Risk Identification and Evaluation, Sourcing, Procurement, Risk Category, Tool

Contents

Preface

Abstract

Table of Contents

List of Figures

List of Tables

Acronyms

1	Introduction	1
1.1	Key Concepts	2
1.2	Case Company Background	3
1.3	Business Challenge	4
1.4	Objective and Scope	5
2	Method and Material	6
2.1	Research Approach	6
2.2	Research Design	7
2.3	Data Collection and Analysis	10
2.4	Validity and Reliability Plan	15
3	Current State Analysis	17
3.1	Overview of the Current State Analysis Process	17
3.2	Supplier Checks in Different Stages of the Purchasing Process	17
3.2.1	How the Supplier Selection Is Made	22
3.2.2	New Supplier Approval Process	26
3.2.3	Supplier Monitoring	29
3.3	Selection of the Findings to Move on With	31
3.4	Summary of the Current State Analysis	34
4	Best Practice in Supplier Risk Identification	36
4.1	Suppliers Risk Categories	36
4.2	Tactical and Strategic Sourcing	38
4.3	Tools Helping Assess and Manage Supplier Risk	41
4.3.1	Supplier Evaluation and Selection	42
4.3.2	Supplier Categories	44
4.4	Conceptual Framework of Supplier Risk Identification	45

5	Building a Proposal for the Case Company	47
5.1	Description of the Proposal Building Process	47
5.2	Development Ideas from Data Collection 2	48
5.3	Proposal Draft Creation	51
5.3.1	Brief Revisit to Existing Knowledge	51
5.3.2	Creation of the User Guide Proposal	53
5.3.3	Creation of the Checklist Proposal Draft	55
5.4	The Proposal Draft	60
6	Validation of the Proposal	62
6.1	Findings of Data Collection 3	62
6.2	Final Proposal	62
6.3	Recommended Next Steps	65
7	Discussion and Conclusions	67
7.1	Summary	67
7.2	Practical Implications	68
7.3	Evaluation of the Thesis	68
7.3.1	Outcome vs Objective	69
7.3.2	Reliability and Validity	70
References		
Appendices		
Appendix 1. Research Interview Template		
Appendix 2. Notes from the Workshop		

List of Figures

Figure 2-1 Research Design of this Thesis	8
Figure 3-1 Procurement Process according to Policy	18
Figure 3-2 Current Purchase Process	21
Figure 3-3 Interview findings related to Supplier Selection phase	25
Figure 3-4 Interview findings related to New Supplier Approval	26
Figure 3-5 Process of Adding a New Supplier	27
Figure 3-6 Interview Findings Related to Supplier Monitoring	30
Figure 3-7 Fishbone diagram of the Strengths and Weaknesses	31
Figure 4-1 Supplier risk categories according to Sollish and Semanik (2011)	37
Figure 4-2 An activity diagram of the steps used for shaping the purchasing strategies (Park et al 2000: 500)	39
Figure 4-3 Strategic Sourcing Process (Novack & Simco 1991)	40
Figure 4-4 The Strategic and Operational Procurement Processes (Smith, 2012)	41
Figure 4-5 Development of a Supplier Evaluation and Selection Survey (Monczka et al 2011)	43
Figure 4-6 Conceptual Framework of Supplier Risk Evaluation	46
Figure 5-1 Preliminary proposal presented in co-creation workshop	48
Figure 5-2 Risk Matrix for Federal Highway Administration	52
Figure 5-3 Conceptual Framework on Supplier Risk Identification revisited	53
Figure 5-4 Proposed User Guide	54
Figure 5-5 Proposal building step 1	56
Figure 5-6 Proposal building step 2	57
Figure 5-7 Proposal building step 3	58
Figure 5-8 Partial screenshot of the proposal	61
Figure 6-1 The final proposal, sheet 1	63
Figure 6-2 The final proposal, sheet 2	64
Figure 6-3 The final proposal, sheet 3	65

List of Tables

Table 2-1 Data collection	11
Table 2-2 Interview details	12
Table 2-3 List of internal documents	13
Table 2-4 Benchmark documents	14

Table 2-5 Case Study Tactics for Four Design Tests	15
Table 3-1 Number of new suppliers added in 2015	23
Table 3-2 Summary of Strengths	32
Table 3-3 Summary of weaknesses	33
Table 5-1 Co-creation workshop results.....	50
Table 5-2 Risk color matrix	60

Acronyms

ERP	Enterprise Resource Planning
COGS	Cost of Goods Sold
CSA	Current State Analysis
HW	Hardware
IP	Intellectual Property
KAM	Key Account Manager
KPI	Key Performance Indicator
LSSE	Light Supplier Self-Evaluation
ODM	Original Design Manufacturer
OEM	Original Equipment Manufacturer
NDA	Non-disclosure Agreement
PR	Purchase Request
R&D	Research and Development
RFx	Request For x (i.e Quotation, Proposal or Information)
SaaS	Software as a Service
SOW	Statement of Work
SPL	Sanctioned Party Listing
SW	Software
VMD	Vendor Master Data

1 Introduction

Doing business means taking risks, some bigger than others. It is up to each company and its departments to define what kinds of risks they are willing to take. Some risks can be avoided by carefully defining the processes to overcome them, and others are to be acknowledged and taken deliberately.

One interesting risk generating area is the company's suppliers. Organizations are more and more focusing on their core competences and outsourcing other functions. Outsourcing became increasingly visible in the 90's when, after some mistakes, it became clear that companies need to have control of the activities affecting product performance (Zirpoli 2011: 59). Outsourcing important tasks to different suppliers means that if something goes wrong with the selected partner, it can have a negative effect on the company. One potential risk is that if the current supplier is not performing as required, changing suppliers can still be very costly. Additionally, customers might get dissatisfied because of delays in production if a supplier goes bankrupt. As an increasingly severe risk in the modern times, the company's reputation can be ruined, if for example the supplier is using child labor.

Companies no longer have the luxury of controlling what is written about them in the media. Consumers have been given a lot of power through different social media platforms, which they utilize for example to raise awareness of big corporations not acting ethically. Customers expect companies to be socially responsible and if they need to demand this social responsibility, it might already be too late for the company to take action (Jones 2011: 4). Customers might turn their backs on the company, and ask their large networks to do the same, in no time.

How companies then control their suppliers and ensure ethical behavior? Procedures on how suppliers are selected and evaluated, monitored and finally how risks are identified vary and are dependent on for example the size of the company as well as the business they are in. If the company is operating globally, some suppliers might come from very different cultures, and bring new risks to consider. Every company is different and must find their own way to identify and manage supplier risks.

To give the reader an idea of the focus of this study, the next sections discuss the setting by introducing the key concepts, the case company and its business challenge, and present the objective.

1.1 Key Concepts

As the saying goes, no man is an island (Donne 1624). It means humans cannot thrive if they are isolated from others, and thus they rely on each other. The saying can be applied to companies also. All companies must buy goods and services from other companies, called suppliers, in order to provide their own expertise to customers. But relying on wrong suppliers may be disastrous. If they cannot provide what they are expected to, customers might end up not getting what they have requested and turn to competitors.

But sometimes it is not all that easy to choose which suppliers to trust. Sometimes no good option exists, but one has to pick the least bad option available. In the situation where a risk cannot be avoided, it needs to be managed. And to know what needs to be managed, risks must be identified and evaluated. Therefore, three important concepts of this study are *risk identification*, *risk evaluation* and *risk management*. Risk identification is acknowledging risks. Sometimes they are evident, sometimes some investigation is needed. Risk must then be evaluated. It must be decided if the benefits are greater than the risk, whether they are minor or if the consequences would be catastrophic. If the risk is minor and unlikely to occur, putting too much effort to trying to control it is not feasible. But if the risk is something that would have a major, very negative effect on the company, it needs to be managed somehow. Some risks can easily be mitigated by actively managing them.

Nowadays there are different functions and departments in companies responsible for obtaining external goods and services needed for creating the company core offering. *Procurement* is defined as: “all activities required in order to get the product from the supplier to its final destination” and *sourcing* as “finding, selecting, contracting and managing the best possible source of supply on a worldwide basis” (Weele 2010: 7-10). These two concepts are strongly present in this study.

To understand the context of this study, the reader should also be aware of the environment where these concepts appear. Therefore the next section introduces the case company on a high level.

1.2 Case Company Background

The case company in this study is a medium sized organization founded two years ago by a big multinational corporation that is headquartered in Finland. It was founded to become the innovation engine of the corporation and is focused on creating and licensing world class technologies of various kinds. The case company has recently entered product business with a high value, low volume professional equipment. The case company is located in three different countries, with two main locations and few smaller sites.

The organization, processes and strategy of the case company have been developed and planned during the first year of its existence, and the first product of the company has been launched and will be shipped to customers in the near future. The case company does not have manufacturing of its own, but it uses Original Design Manufacturer (ODM) and Original Equipment Manufacturer (OEM) models when bringing products to markets. In the ODM model the case company has selected a company to do only the manufacturing on their behalf, and in the OEM model the manufacturing company uses the case company design and logo, and can even take care of supply chain management all the way to end users.

The support functions of the case company have been kept at a minimum level as the business has been in its baby steps so far. This results in a self-service mode, in which every employee has to be involved in practicalities. For instance if an employee wants to buy some non-critical equipment needed for work, they need to look for suppliers, get quotations and negotiate the pricing themselves, instead of asking the procurement department to do this on their behalf. All employees have their own way of working, and depending on how much effort they want to put into due diligence varies.

Trying to work in an agile start-up-mode the case company faces obstacles as it is stock-listed. The shareholders' benefits are closely monitored by several authorities, resulting in some rigid processes. Due to the fast moving nature of the business environment, agility is desired and excessive bureaucracy is to be avoided whenever possible.

1.3 Business Challenge

The renewed strategy of the case company was released only quite recently, and before that it was nearly a full year of uncertainty where the business focus would be. New business areas have been probed with some turning out to be more interesting than others. This is why it has not been feasible to put too much effort on defining who the key suppliers of the company are, how much they will be used and how much can be done in-house compared to buying from outside. Now that the strategy has been implemented and everyone knows their role, practices must be fine-tuned to reflect the situation at hand.

The case company is a developer of sophisticated technologies. This means the products and services they need are often not offered by a number of suppliers, and the selection cannot be made from a big pool of suppliers. Instead, possible risks must be identified, minimized where possible, and the suppliers producing the biggest risk to business should be monitored.

Currently there is no consistent way of studying the suppliers and evaluating how big of a risk they are for the case company and how to manage the potential risk. Due to the short operating history of the case company, supplier categories such as “preferred supplier” and “strategic supplier” have not been defined for most sourcing categories. It has not been feasible, as it has not been clear what the case company strategy is. If the case company does not improve the way of managing supplier risks, some suppliers might generate unwanted surprises at critical points in time. If the business owner does not know the possible risks, they cannot plan their business securely.

The case company has to work according to its parent company’s high level standards and protect the brand it has established. However, the size of the case company organization is significantly smaller and the nature of its business requires more agile ways of working. For instance, new suppliers are requested on a daily basis to be added into the Enterprise Resource Planning (ERP) system, as the case company has just recently decided to enter new business areas. This is why the parent company’s well established procedures cannot be implemented as such and a more modern touch is required.

1.4 Objective and Scope

The objective of the study is: *To create a tool that enables the case company to understand the risks created by its suppliers.*

It is clear that if something should go wrong with a supplier, the one providing office supplies would not have as significant impact on the case company as the most strategic business partners would. The process used to identify and manage the risks should however be agile and flexible, not becoming a roadblock in a fast moving technology company.

The tool helps the case company to understand the supplier risks it is facing. Creating a tool is important because when the risks suppliers present are evaluated consistently, different supplier risk management approaches can be developed and utilized. Ultimately the leadership team can sleep their nights a bit better knowing that the shareholders money is being looked after.

The tool designed should be a simple checklist, so that the employee does not have to spend hours filling it out, but they would get a view on potential risks with a relatively small effort. It expedites the process by indicating clearly the details to be checked about the supplier without extensive email exchange between different departments during the new supplier approval process. It could also be used to open the eyes of the business owners to possible risks threatening their business.

This thesis is divided in different sections. After explaining the methods and materials in section 2 of the research, the current state in the case company is presented in section 3. Based on the findings, existing knowledge is studied through literature, articles and benchmarking, and presented in the following section. This is followed by section 5, building a proposal and section 6, validating it. Discussion and conclusion in section 7 summarizes the study and finally evaluates the research.

2 Method and Material

The aim of this section is to provide the reader with an overview of how the research has been conducted. To this end, the research approach, design, data collection and data analysis are presented.

2.1 Research Approach

There are different ways of conducting research. Quantitative research uses data in metrics that can be calculated and is collected in a systematic way (Hagan 2014: 431), whereas qualitative research collects data that cannot be categorized into units but for example into patterns. Qualitative researchers are interested in how people interpret their experiences (Merriam 2009: 5). As the data collected and analyzed in this study is not measurable in units and is colored with individual interpretations, this research is characterized as qualitative.

This thesis is focused on solving the business challenge in the case company's ability to identify and understand the risks suppliers are presenting. Due to the nature of the business challenge the research approach selected is case study. Yin (2003: 13-14) defines case study in the following way:

“A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident. “

(...)

“The case study inquiry copes with the technically distinctive situation in which there will be many variables of interest that data points and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis”

A study is a case study when the purpose is to study a case (i.e. an organization, a group) in order to answer a research question, by using multiple sources (Gillham 2000: 1). Case study is used when a researcher is looking for an answer to a question starting with “why”, “who”, “what”, “where”, “when” or “how”. In order to find the correct answer to this question, a researcher must collect data around the relevant phenomenon.

In order to approach the business challenge and understand how the risk identification is performed today, data for this research is collected empirically by e.g. conducting interviews and hosting workshops in the real-life context of the phenomenon. The findings are documented and reader is given enough evidence so that they know they can trust the research. Next, the reader is presented the steps that are taken to reach the final outcome by discussing the research design in detail.

2.2 Research Design

Research design presents the key elements of the research as well as the steps taken with the aim of reaching the final proposal in a systematic manner. This section illustrates the components of the research graphically and gives the reasoning why the research was designed in this particular manner. The research design is built around different stages of the research. The stages have individual goals, data sources and expected outcomes. The research design is presented in Figure 2-1 below.

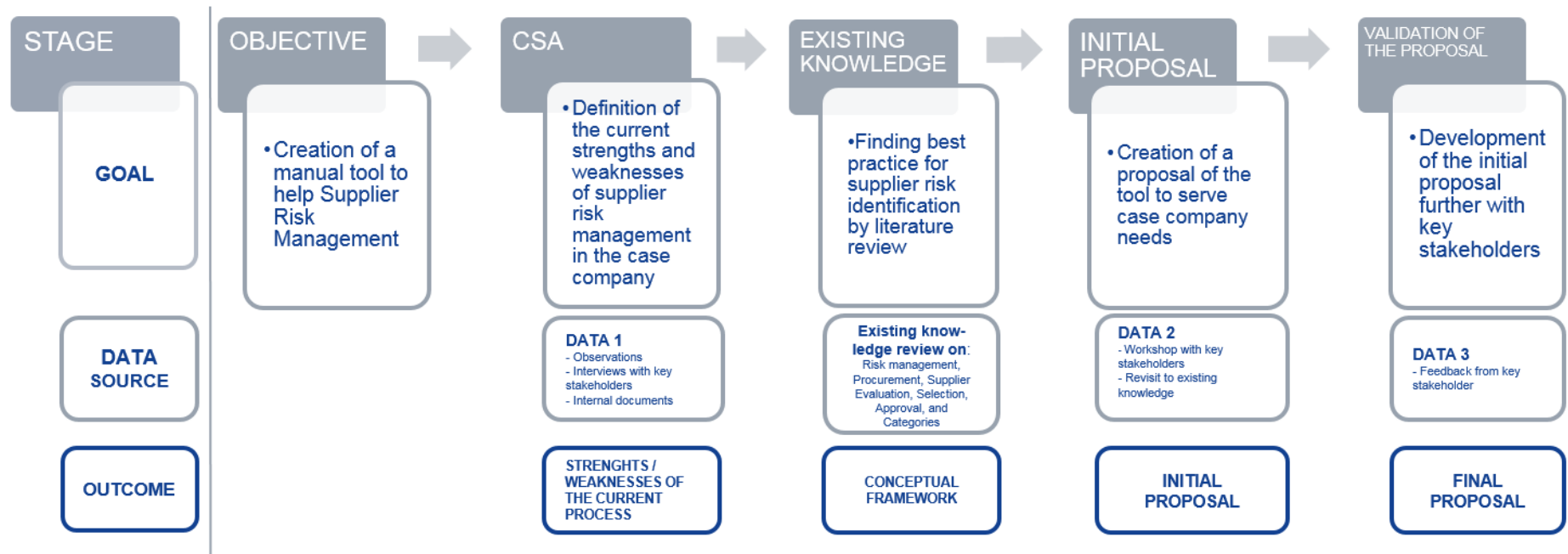


Figure 2-1 Research Design of this Thesis

The first stage of the research is to select an objective for the study. A business challenge is selected from a list of development suggestions provided by consultants who evaluated the case company sourcing capabilities in September-October 2015. The project defined the level of different capabilities in sourcing by placing the case company in one of the categories Basic, Advanced or Leading, depending on their findings from interviews and observations. From the report findings, the topic “Risk and Regulation” was selected to be studied further in this study. According to the consultants, the case company was on “Basic” level when it came to risk and regulations, meaning supplier qualification was not structured, formal risk management approach did not exist and there were no tools available. The desired state to be reached by the end of 2016 was defined as “advanced”, meaning “manual supplier profiling, procurement risk management, compliance control in place, trade-off decisions”. In this study, the scope is narrowed down to focus mainly on manual supplier risk evaluation, to enable a careful study in the available timeframe.

The second stage of the research is to understand the case company’s current state in the context of the research, i.e. level of understanding and identifying supplier risks. The Current State Analysis is carried out by collecting data from various sources using different methods, i.e. interviews, internal documents and observations. The interviewees are selected from several departments and have different views on the topic, so that an overall picture can be obtained. Internal documentation is studied to gain knowledge on how processes have been planned, and observations are done to avoid trusting only what people say. The information gathered in this stage presents the first data collection point of the research, Data 1. This Data 1 is used to identify and document the strengths and weaknesses regarding supplier profiling. The findings related to supplier risk identification are categorized in different groups by different stages of the procurement process to understand at which point risk identification is currently done. After the main weaknesses have been identified, key strengths are recognized also to avoid forgetting them in the final proposal.

The third stage focuses on existing knowledge on the topics selected in the Current State Analysis. The focus of the review in this stage is decided only after the strengths and weaknesses of the current practices have been identified to avoid excessive reading. Books, articles and consultancy papers on the selected topics are studied in order to formulate the outcome of this stage, the Conceptual Framework. This outcome is used when building the initial proposal for the case company.

The initial proposal is co-created in the fourth stage of the research in a workshop with case company key stakeholders. The Conceptual Framework from stage four is presented to the participants and the initial proposal is formulated based on the arising ideas. In this stage the second data collection takes place. Data 2 consists of field notes from the workshop and comments received afterwards and is used when the initial proposal is formulated.

By pulling together the findings from the Current State Analysis, the Conceptual Framework developed from existing knowledge, and the ideas presented in the workshop, the initial proposal is created in stage five. The initial proposal is presented to the key stakeholder from the case company, who is the person who has the mandate to decide whether the tool will be taken into use or not. The outcome of stage five is the final proposal created in this study.

2.3 Data Collection and Analysis

Data for this research was collected in three different stages: In data collection 1 by conducting interviews, studying existing documentation and by author's observations, in data collection 2 by collecting feedback in a workshop and finally in data collection 3 where the final proposal is produced from feedback from a case company key stakeholder. Different data collection methods in different data collections are visualized with their sources in Table 2-1 below.

Table 2-1 Data collection

Data	Purpose	Data type	Data source	Analysis
Data 1	Understand supplier management practices in different departments and identify strengths/weaknesses	1. Interviews with key stakeholders	Purchasing Manager Sourcing Manager (Direct) Operational Purchaser Head of Business Unit Senior Sourcing Manager (Indirect)	Section 3, CSA
		2. Internal documents	Policies Agreement Appendices Intra Supplier Instructions	
		3. Observations	Notes	
Data 2	Building the proposal	1. Workshops with key stakeholders	Head of Sourcing, Purchase, Purchaser, Legal Council, Sourcing Manager	Section 5, Building the Proposal
		2. Internal documents	Tool used in a divested business unit	
Data 3	Validating the proposal	1. Meetings with key stakeholder	Final proposal	Section 6, Validation

As shown in Table 2-1, data was collected in several different ways ranging from interviews and internal documents to observations, workshops and meetings. Next, the different methods are explained in more detail.

Interviews

As seen from Table 2-1, collection of data collection 1 starts with interviews. The interviewees were selected from groups of people working with suppliers, but having different views on the topic. No one refused the interview, but due to the fact that most of the interviewees are working on other sites, having a face-to-face interview with everyone was not possible. The mostly used communication method was Skype for Business where interviewees were able to follow the question template through a shared screen.

The interviews were semi-structured, meaning the pre-planned questions were open ended and enabled discussion focusing on issues most visible to the interviewee. Details of the semi-structured interviews conducted in data collection 1 are given in Table 2-1 below.

Table 2-2 Interview Details

Type of interview	Interviewee Role	Focus	Date	Length	Document
1-to-1 Skype for Business	Purchasing Manager	Supplier approval, processes	8.1.2016	37 min	Recording (+ transcript)
1-to-1 Skype for Business	Head of Business Unit	Supplier searching, selection, process	21.1.2016	36 min	Recording (+ transcript)
1-to-1 Skype for Business	Senior Sourcing Manager (Direct)	Supplier management	28.1.2016	31 min	Recording (+ transcript)
1-to-1 Face-to-face	Purchaser	Supplier approval, processes	4.2.2016	30 min	Recording (+ transcript)
1-to-1 Face-to-face	Senior Sourcing Manager (Indirect)	Supplier selection, responsibilities, process	17.2.2016	35 min	Recording (+ transcript)

Table 2-2 shows the interviewees were selected from different departments, i.e. sourcing, purchasing and a business unit, and everyone was interviewed individually. The goal of the interviews was to understand how often the interviewees work with new suppliers, what they always or sometimes check about them, if they have any tools available and if there is any monitoring of suppliers after they have become a supplier. Development suggestions were also asked.

The interview question template was improved after the first interviews by removing some questions only resulting in repetition. The template that was used is attached as Appendix 1. The focus of the interview was adjusted and additional questions were asked according to the interviewee's experiences. Research bias required some attention while conducting the interviews. After observing the case company processes and already knowing some of the problems, the additional questions tended to guide the interviewee towards saying what the researcher wanted to document. Sometimes conversations got sidetracked, and the researcher presented their own opinion on the topics. It was evident that a beginner was doing the interviews. This, in addition to taking time from very busy employees, resulted in the interviews focusing on things interviewees wanted to say and they were not really pushed to open up more. Conducting the interviews felt slightly uncomfortable, knowing that the employees were all busy with their responsibilities. As the situation the case company was in seemed to be visible by observing, making a big revelation seemed unlikely. In spite of the weaknesses, conversations with the interviewees were not forced, but lively, touching on other topics also.

The data analysis for the interviews was done using content analysis of qualitative data. The interviews were documented in the field notes and a recording that was later transcribed to help the analysis. The transcripts and recordings were sent to the interviewees for comments and corrections before the analysis. The transcripts were studied to find quotes by the interviewees that seemed to hold important pieces of information and were related to the topic. After this, the quotes were organized under identified themes that relate to the business challenge and seemed important to the interviewees.

Internal documents

In addition to the interviews, Data 1 consists also of internal documents of the case company. The documents selected are the ones related to supplier management and purchasing process. Some information was searched from company intranet, and some was received directly from employees of the case company. All documents reviewed for this study are listed in Table 2-3 below.

Table 2-3 List of internal documents

Document name	Size	Document type
1. [Case Company] Procurement Procedure	9 p	Standard Operating Procedure
2. Supplier Onboarding Document	6 p	Purchase Order appendix for new suppliers
3. [Case company] Supplier requirements	55 p	Agreement appendix
4. Supplier security requirements	9 p	Agreement appendix
5. Business Justification Form	1 p	New supplier approval
6. Supplier Data Request Form	1 p	New supplier approval
7. "New Supplier Approval", "Supplier Requirements & Assessment"		Intra-page
8. Code of Conduct	25 p	Group-level Code of Conduct
9. Check list for new suppliers	2p	Purchasing team internal guide
10. Sourcing Metrics 2015	x	Internal presentation

The internal documents in Data 1 come from different categories. Some are policies, some internal forms and some agreement appendices. They were selected for this study to gain an overall picture of the current ways of working and to understand the company mindset when it comes to suppliers.

Procurement Procedure is used in this research to give an overall picture of the purchasing guidelines and map the official purchasing process and compare it to what is actually

happening. The Supplier Requirements document lists the obligations of the suppliers whereas Supplier Security Requirements focuses on, as the name implies, on the security aspects of supplier. The Business Justification Form and Supplier Data Request are documents used when a new supplier is added and in addition to the purchasing team's internal guide a couple of intra-pages are used to study this process. The Code of Conduct sets the framework around how the case company makes business and Sourcing Metrics 2015 sheds light on the current status in procurement.

In addition to data collection 1, internal documentation was also gathered during data collection 2. Risk checklists used in the old business units that operated in a different business environment were received from case company employees to be used as benchmark. The documents are listed in Table 2-3.

Table 2-4 Benchmark documents

Proposal benchmark documents	Document type
SW_SLM_KeyRisk_template25 Collaboration Risk Management Tool SW licensing Checklist	Excel documents with multiple sheets. Origin: affiliate company and old, divested business unit.

One additional benchmark document was received during data collection 3 from the case company key stakeholder. It was however not used in the final proposal building, but added to the implementation plan.

Observations

Some of Data 1 was gathered through observations. The case company was studied by observing the everyday work and collecting information about current practices especially in supplier approval and monitoring. Conversations between employees revealed especially the problems they face on a continuous basis. This information was documented as notes, and analysis was made to find out how much it supports the other findings.

Workshop

A workshop was conducted during data collection 2 to collect requirements and ideas for the proposal. The Conceptual Framework was presented to the participants with a preliminary proposal. The employees were encouraged to brainstorm how the tool should function in order to bring the most benefit to the case company operations. This data 2 was analyzed by categorizing the workshop comments into different themes related to

the desired tool and by comparing them to the benchmark documents to obtain insights on what could be the right way to build the proposal.

2.4 Validity and Reliability Plan

A good research is one that the reader knows they can trust. The researcher must make the research in a way that supports trustworthiness and provides enough evidence of the process for the reader to convince them the research is reliable.

There are four tests common in social studies that are used to judge the quality of a research (Yin 2003: 34) . The tests are called construct validity, internal validity, external validity and reliability. The following table demonstrates the different tactics for each test Yin lists as means to ensure that validity and reliability requirements are met.

Table 2-5 Case Study Tactics for Four Design Tests
Tactics used in this research are **bolded**. Referenced by Yin, original source Cosmos Corporation (Yin 2003: 34)

Tests	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	• Use multiple sources of evidence	Data collection
	• Establish chain of evidence	Data collection
	• Have key informants review draft case study report	Composition
Internal validity	• Do pattern matching	Data analysis
	• Do explanation building	Data analysis
	• Address rival explanations	Data analysis
	• Use logic models	Data analysis
External validity	• Use theory in single-case studies	Research design
	• Use replication logic in multiple-case studies	Research design
Reliability	• Use case study protocol	Data collection
	• Develop case study database	Data collection

Construct validity test examines if the data has been collected from sources important to the topic, not the researcher. According to O'Leary-Kelly & Vokurka (1998: 387) “*Construct validity pertains to the degree to which the measure of a construct sufficiently measures the intended concept (e.g., is free of measurement error) and has been shown to be a necessary component of the research process*”. If the research does not include all aspects relevant to the case, the outcome might not be truthful.

In this research, data is collected from various sources, through multiple channels and departments in order to ensure triangulation of data. A chain of evidence is created by giving the reader enough information to give them an idea of the steps taken from the research question to the ultimate case study conclusion. The case study proposal draft is also given for the key stakeholders for review to ensure it captures the reality.

Internal validity strives for making sure the evidence collected is airtight, if the inference is correct and all aspects have been taken into account. The researcher should not assume there is a relationship between findings Z and X unless they have investigated there is no Y that might have an influence. (Yin 2003: 36) All of the internal validity tactics are used in this study to ensure the quality of data analysis (Yin 2003: 116) and explained in detail in section 7.3.2.

External validity as the third test deals with the generalization of the findings. This refers to whether the findings can be applicable to external cases also. In this study, this was not tested.

Reliability tests if the research is replicable. This mean someone else should be able to do the same research and arrive at same findings and conclusion (Yin 2003: 37). To make this possible, the procedures followed in the research must be documented. It might help to think that the research might get audited ten years after the publication and the auditor should be able to produce same results. For this study, the setting of the business challenge is changing rapidly, and replication afterwards may be difficult. But the evidence is collected in such a way that if someone were to make it immediately after the original research, the same conclusions would be drawn.

The validity and reliability of this study is evaluated after the study has been done and the objective has been reached, in section 7.

3 Current State Analysis

This section discusses the Current State Analysis as a process and presents the key findings it revealed. The strengths and weaknesses identified are discussed, and the selection of the issues to be tackled in this study are presented.

3.1 Overview of the Current State Analysis Process

The purpose of the Current State Analysis (CSA) is to define the status of the case company in relation to the business challenge, namely supplier risk identification and risk management. The CSA was conducted in January-February 2016. The procurement organization of the case company was re-organized during the analysis by dividing indirect and direct sourcing into different teams, but this did not have a substantial effect on the processes. In fact, it was very minimal in practice.

The data used in the CSA was collected through interviews, internal documentation and observations. The analysis starts with an examination of the procurement process. The current process is mapped first in theory then in practice, and is followed by an identification of the points where risk identification is made and an exploration of how it is conducted. The findings from data collection 1 are analyzed by categorizing them first into different phases of the procurement process and then into different themes. The outcome of the CSA is a list of weaknesses, that need improvement, and strengths, that should be acknowledged and supported in order to reach the optimal outcome.

In the following sections the procurement process is first explained on a high level, and then the focus is on the different parts of the supplier lifecycle, i.e. supplier selection phase, new supplier approval process and finally supplier monitoring. Lastly the summary of the strengths and weaknesses is provided and the selection of the issues to be improved is justified.

3.2 Supplier Checks in Different Stages of the Purchasing Process

In order to understand how the case company manages supplier risk, the first step is to understand the procurement process on a high level. The way the purchasing decisions are made might have an effect on the supplier risks the company is facing.

At first, the focus is on the procurement policy and the goal is to define how purchasing is done “by the book”. Next, the process is studied in real life and the points where the suppliers are somehow checked are identified and the method is determined.

The process according to policy

By studying the case company procurement procedure, the purchasing process was mapped as visualized in Figure 3-1 below. The main idea is to show the process flow and indicate the department involved in each step.

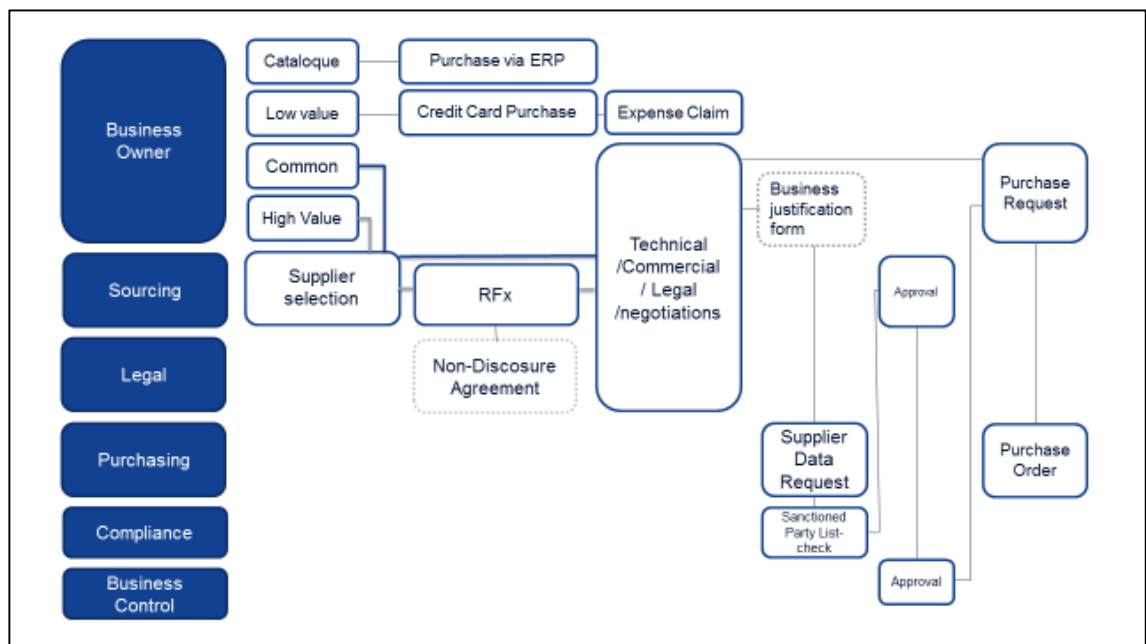


Figure 3-1 Procurement Process according to Policy

In the policy, the purchases are divided into four categories: Catalogue, Low Value Purchasing, Common Purchasing and High Value Purchasing. They are presented in Figure 3-1 on the Business Owner-section as each purchase starts with a business need. The monetary value of the purchase defines the category for most parts, but some exceptions exist. What is missing from this process chart is the “non-PO process”. The policy only states there are some exceptional cases that are handled by just processing the invoice without a Purchase Order, but there is no list available of such exceptions. In practice, for example, the low value purchase is only approved via credit card in the procedure, but it has been observed that many suppliers do not accept this method of payment. Employees either make a Purchase Request (PR) that might have a value of 50 euros, or they are case by case advised by the procurement team to ask the supplier to issue an invoice and it gets handled by accounts payable without a purchase order. Low value

purchase orders are not recommended as they increase the workload of the purchasing team without bringing any significant advantages. Other approved non-PO purchases are for example standard trainings employees attend and some workplace related costs, like electricity.

Catalogue purchases include pre-defined, standard IT-hardware to be ordered via the ERP system, and require no actions from the purchasing team. The supplier catalogue is integrated into the case company ERP-system and all employees can browse the offered items and purchase them with negotiated prices by just a few clicks. This purchasing category is not relevant to this study, as the catalogue purchases are done only to a specific supplier that has been selected through an extensive RFx (meaning either Request for Quotation, Request for Proposal or Request for Information) process.

The Low Value Purchases are handled outside the ERP-system, by company credit cards provided for every employee. The case company has defined a threshold value for a purchase that must be done via credit card, and another maximum value the low value purchasing process can be used up to. This category includes a few exceptions: software licenses or any Intellectual Property (IP) cannot be purchased this way, as the ownership of the license or IP is not transferred to the case company, but would be vested in the individual only. As discussed earlier, another exception is the cases where the supplier does not accept credit card as a payment method and the purchase gets then handled via a non-PO process, where the supplier can just issue an invoice and it gets processed by accounts payable. Interviews 1 and 5 revealed that these non-PO suppliers need to be added to the ERP-system also, but they are marked as one-time suppliers. This means that after the business owner has confirmed the purchase, the supplier is only asked to confirm their bank account, so that frauds can be avoided. This way, low value, not critical purchases get only reasonable amount of attention, but if the supplier is selected for a bigger purchase later on, it will get checked more carefully before the purchase is approved.

The rest of the purchases made in the ordinary course of business are categorized in common and high value purchasing. What differentiates them from each other is the monetary value. The first threshold obligates the business owner to involve sourcing, and the second to conduct a RFQ round resulting in obtaining minimum of two quotations.

For common and low value purchases employees must make a PR in the ERP-system, which are then reviewed by the purchasing team for compliance, and transformed into Purchase Orders that are approved by the cost center managers in the system before they are sent to suppliers.

The policy states that if new suppliers are required, business owners need to provide a Business Justification Form providing basic information why the supplier is needed. For example, the form makes sure the employee is not introducing the company because they have family members working there, but the service/product cannot be bought from any existing suppliers.

Regarding the supplier qualification and evaluation, the policy does not, apart from the requirement of SPL-check, give explicit requirements but states:

“[Case company] works with qualified, reliable, technically competent and financially stable suppliers who are in compliance with laws and follow [case company] Supplier Requirements and Code of Conduct”

Detailed supplier requirements are listed in the Code of Conduct and [Case Company] Supplier requirements that is used as an appendix only in bigger agreements.

The process in real life

The process in reality was mapped during the Current State Analysis by interviews and observations, and some variation was identified. *Figure 3-2 Current Purchase Process* below also presents the identified points where suppliers are checked somehow, something that is not explicitly instructed in the procedure. To help the analysis, the process is divided into three parts when the supplier check-points are identified. The phases are supplier selection phase, new supplier approval process and supplier monitoring. The goal is to discover the pain points and identify development needs. The high level purchasing process in real life was studied by reading internal documentation, through interviews and by making observations.

be finalized, even in a case of high value purchasing. This brings up the question whether sourcing is really responsible for the supplier selection as stated in the procurement policy. As mentioned in Interview 5, most of the new suppliers *“come from business because they have very specific requirements and have no multiple options available”*. The situation can partly be explained by the young age of the organization and the lack of strategy during the first year of its existence. This results in not having preferred suppliers and new suppliers are sourced on an ongoing basis as it has not been feasible to put too much effort into it while the strategy has not been in place. Through observations and interviews it was concluded that sourcing does more supplier risk assessment than business owners. As discovered through observations and in Interview 3 with a business representative, business is more interested in the product or service than due diligence and due to the fact many have background in research, they do not even have the skills for conducting assessments. This can be seen as risky, as most of the suppliers are introduced by business. The sourcing organization does not have enough headcount to be involved in every sourcing activity and must select the cases where they can add most value.

The end part of the purchase process, starting from new supplier approval, is done according to the procedure. In the interviews it became clear that certain steps are done in a consistent way. Still, it was discussed if this new supplier approval process really adds value or if it is just “a bookkeeping issue”. It was discussed in the interviews whether the approval process should either be revisited and evaluate what is the best way of doing things, or if the process should be reinforced.

The strengths and weaknesses regarding supplier checks are studied next more closely by dividing them into different sections using different stages of the process, namely supplier selection, new supplier approval and supplier monitoring.

3.2.1 How the Supplier Selection Is Made

The purchasing process starts with identifying the need to make a purchase and definition of the source from where the purchase could be made. The business need for the purchase could mean parts for a product going to customers, service needed to support internal activities or subcontracting parts of a project. Sometimes the need is for a long term supplier, sometimes only one time purchase is required. In this study, the phase where the possible source of goods or services is explored is called the supplier selection

phase. In practice this can mean the pre-evaluation of new suppliers or making the selection from a pool of already approved suppliers.

Selecting new suppliers is an important topic to the case company as the case company is only a couple of years old and is entering new business segments and locations. According to internal Sourcing Metrics 2015 the case company adds on average 40 new suppliers a month, as can be seen in Table 3-1 below.

Table 3-1 Number of new suppliers added in 2015



The case company is part of a big corporation and this gives the case company some benefits of a well-known and reputable player, and brings suppliers pressure to perform well in case they wish to have more business with the affiliated companies. It was also found out in the interviews that companies are interested in the case company and offer their services actively, giving also presentations about their companies. The industry was also recognized as small enough, enabling catching rumors if some supplier might be in trouble. The small industry has however also its negative sides as some products and services cannot be bought from numerous suppliers. Sometimes the case company does not have any other choice but either buy from the supplier able to offer the item or service needed or stop the project.

Identifying suppliers that cannot be used for one reason or another as soon as possible saves time and effort for both parties. Also, collecting information about a potential supplier already in the selection phase is important as one business line is (and others might get) ISO 9001 certified. The supplier selection process, like any other activity in a business line with ISO 9001, must be documented. It was discussed with a quality manager working for the case company during the CSA that ISO requirements include the obligation to provide documentation on why a certain supplier was selected. When justifying a selection, some negative issues on a competitor might get documented and used to justify the choice made.

As discussed in the earlier sections, the purchases made in the ordinary course of business that are not categorized as catalogue or low value purchasing, are called common and high value purchasing. What is purchased via common and high value process includes everything from simple R&D subcontracting to making complex partner agreement with the manufacturer assembling case company products. It can also be Software as a Service (SaaS) purchased for internal activities or hardware (HW) parts for a consumer product. Therefore straightforward instructions cannot be given what needs to be checked when supplier selection is made and new suppliers are evaluated.

According to the case company Procurement Procedure, sourcing is responsible for supplier selection in common and high value purchasing. But as the business owners decide the technical requirements, the special needs often dictate the source of purchase and the only way sourcing can add value is to identify risk and flag them. Through observations it became evident that as many of the employees have a background in research, they are unfamiliar with the due diligence processes. Taking into consideration the pace new suppliers are approved to be added to the ERP system it is clear that the small sourcing cannot be involved in every selection process, but they must focus on the most critical cases.

Figure 3-3 highlights the main findings from the interviews conducted regarding the supplier selection phase. The sentences handpicked from the transcripts are categorized under three different questions: Who finds the potential suppliers, how they are selected and what is checked. From the answers it becomes evident, that suppliers are often selected by the business owners, based on the supplier offerings. This can result in prob-

lems if clear warning signs are missed because the focus is on the deliverable. Purchasing is involved only in data collection and makes no decisions regarding which suppliers to use, and sourcing is not involved in every supplier selection.



Figure 3-3 Interview findings related to Supplier Selection phase

The interviews also revealed that the case company has no consistent way of evaluating the suppliers and through observations it was noted that apart from business justification form and supplier data request, no data is stored about the selection to a repository where it would be available for a number of people.

The interviews show that the way suppliers are evaluated during supplier selection vary depending on the people involved. An experienced sourcing manager might know by heart what to ask, but a heavily business development focused employee might be interested only in the product the company is offering and fail to notice the company is on the verge of bankruptcy or that someone has sued the company for an IP infringement.

For a more critical supplier, some sourcing managers also use the light supplier self-evaluation form (LSSE) which is sent to the supplier for, as the name states, self-evaluation. It is based on the requirements on the [Case Company] Supplier Requirements document, which is used as an appendix in bigger agreements with important suppliers. Checking the supplier credit information is also done if it is considered necessary.

As the case company has only recently launched its first product and it is brought to market using the ODM model, it has had to select only a few suppliers critical to delivering top products to its customers. The sales volumes for this product will not be high, so each supplier can be given a lot of attention, and problems are spotted quickly. But as the business is expected to grow, the way due diligence is performed should be systematic and consistent.

3.2.2 New Supplier Approval Process

Even though the new supplier approval process was found to match the procedure, some weaknesses were found in addition to strengths. Like in the earlier section, the main findings from the interviews that are listed in Figure 3-4 below are divided into three identified themes, namely timing, value-add and process. There were findings regarding the process itself, and timing and value-add it provides were discussed. More detailed discussion about this part was conducted in Interviews 1 and 5 as the interviewees are working in purchasing, closely with the subject.

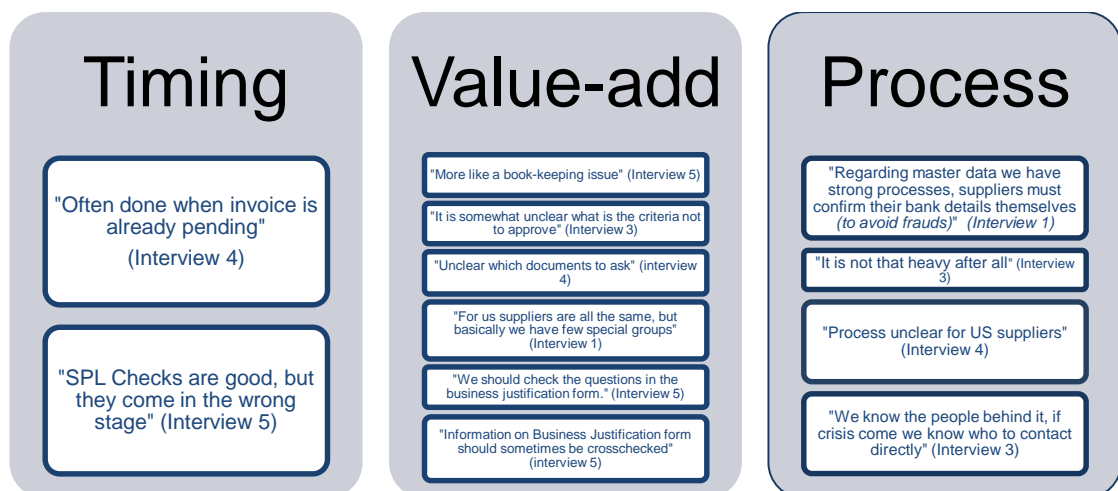


Figure 3-4 Interview findings related to New Supplier Approval

As the case company aims to keep the number of its suppliers in the ERP-system at a manageable level, and not to include the only potential suppliers who might not get an order, the new supplier approval process is initiated only after it is practically certain that the purchase will be made. Using existing suppliers is also recommended strongly.

When a business owner is about to make a purchase from a supplier they anticipate to be a new one, they can either check an infrequently updated list of approved suppliers in the case company intranet, start making a PR in the ERP-system or ask the procurement department to check if the supplier they have in mind is already approved in the ERP-system. This is needed because vendor master data (VMD) is not visible to all employees due to system limitations. Everyone who can see the data can also edit it. Due to compliance and security reasons this cannot be allowed, as e.g. devious individual might change the bank details and money would be paid to wrong account. Figure 3-5 below visualizes the steps needed for making a purchase when it is not known if the supplier is already approved.

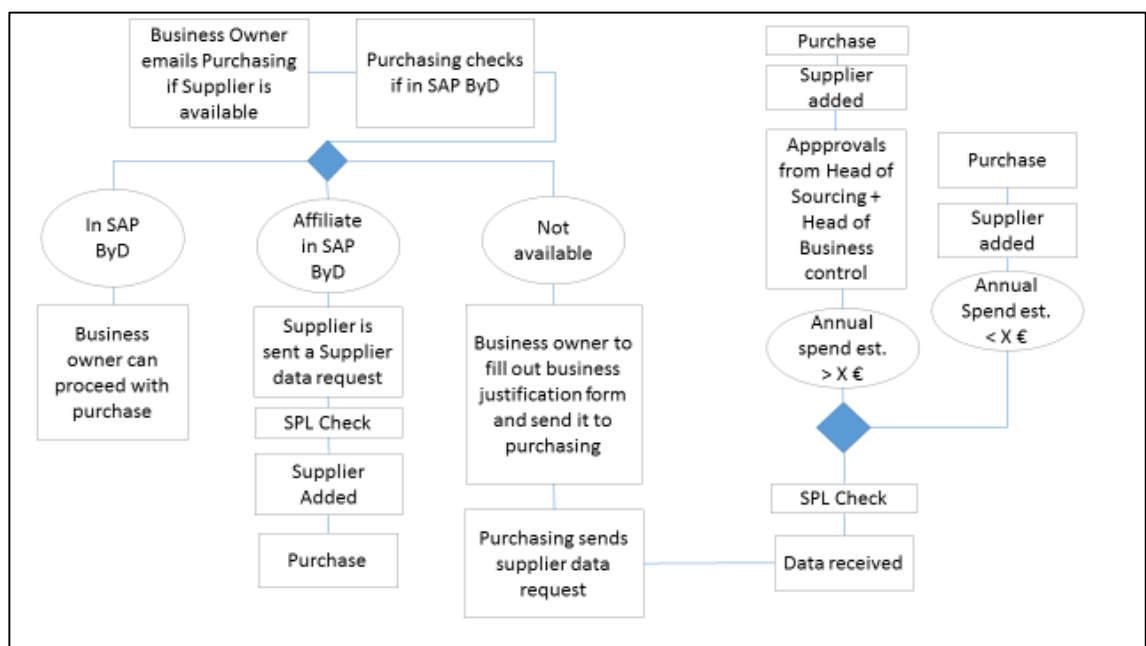


Figure 3-5 Process of Adding a New Supplier

In cases where a company has an affiliate (e.g. sister company in another country) approved as a supplier, the supplier is sent a supplier data request, where they can inform the contact details and registration number of the entity. After the information has been received, the affiliate is checked against sanctioned party listings and added to the system.

If the supplier in question is not in the ERP-system, a business justification form need to be filled out by the employee introducing the supplier. The business justification form is a one page Excel sheet asking for example who is making the purchase, what the company in question is offering, how the selection was done and what the estimated annual

spend is. This form is sent to the purchasing team who then sends the supplier a supplier data request form that asks the supplier the company type, ownership, address, contact person and bank details. In addition to the supplier data request form some other documentation is requested depending on the supplier and services or products offered. For example, US Tax form W9 is needed from suppliers based in the United States and W9 from suppliers offering their services to the case company's US entity. The companies providing subcontracting services in Finland must be checked to make sure they are registered as an employer and have no tax debt. This is due to Finnish act of the contractor's obligations and liability, and can be done via The Business Information System (ytj.fi) for Finnish companies and requires no actions from the supplier. With suppliers outside Finland the process is not very clear, as it is not clear what documentation can be asked in different countries. The biggest speedbump in this process is the supplier data request phase. It was discovered through observations and interviews 1 and 4 that it is not always clear which documents must be requested and that if the supplier does not provide the information, the follow up is not done systematically, but relies on the reminders from the process initiating employee, who might not be aware of their role.

After the supplier has provided the needed documentation, depending on the monetary value of the planned yearly spend of the purchase, the supplier is either added to the system after the SPL-check or approval is requested from the Head of Sourcing and Head of Business control. In addition to these, the Head of Business control approves all the payment term requests that deviate from the case company standard payment term.

One problem in this process is, that it is for most parts the same for every supplier and it is often seen as something that delays the business. In many interviews it came up that sometimes the process would need a "fast-track" for urgent, not critical purchases, but at the same time the size of the organization was recognized, as the people behind the process are known and easy to reach in case of urgency. During the process resources might get wasted because the purchasing team has no visibility if an NDA has been made earlier with the supplier. The SPL-check is done again at this point even if the check has already been done during the NDA process.

As presented in Table 3-1 on average forty suppliers were added every month to the ERP-system. This justifies the need for effective processes, as without them time is wasted wondering how to proceed and red flags, like large tax debt of the supplier, might

go unnoticed. Doing supplier selection carefully gives also insights which suppliers need monitoring and in what respect.

3.2.3 Supplier Monitoring

The case company internal documents do not give guidance on supplier monitoring. No processes have been built to make sure suppliers remain acceptable after the initial approval. For example the ownership of the company might change, and in a worst case a competitor or a sanctioned party might suddenly own the majority of the supplier. They might start using some environmentally harmful chemicals in their products, face financial troubles or someone might sue them for patent infringement. The supplier might even offshore some of its activities and violate human rights in the new location.

In the case company, after the suppliers have been approved and added to the ERP-system, they are sent their first Purchase Order with a Supplier Onboarding Document attached to it. The document explains the invoicing methods of the case company and indicates that the supplier is expected to act in accordance to the case company code of conduct. But this is not monitored systematically. The interview with a direct sourcing manager revealed that they are in contact with the most important suppliers on continuous basis and do monitoring as part of their everyday work. This is possible when the number of suppliers is low, but when the business grows this might get difficult. In the interview with a business unit head it was discussed, that Key Account Managers (KAM) of companies who consider the case company as an important customer are usually active and inform their business contacts about possible changes. It should however be noted that they rarely report negative issues and the information might not reach many people in the case company. But as the requirements from the business are very precise and the industry is quite small, the number of companies able to offer the service or goods in question is limited. This makes it easier to hear rumors out in the field. Employees also change companies and might carry valuable information with them and share it with the case company employees.

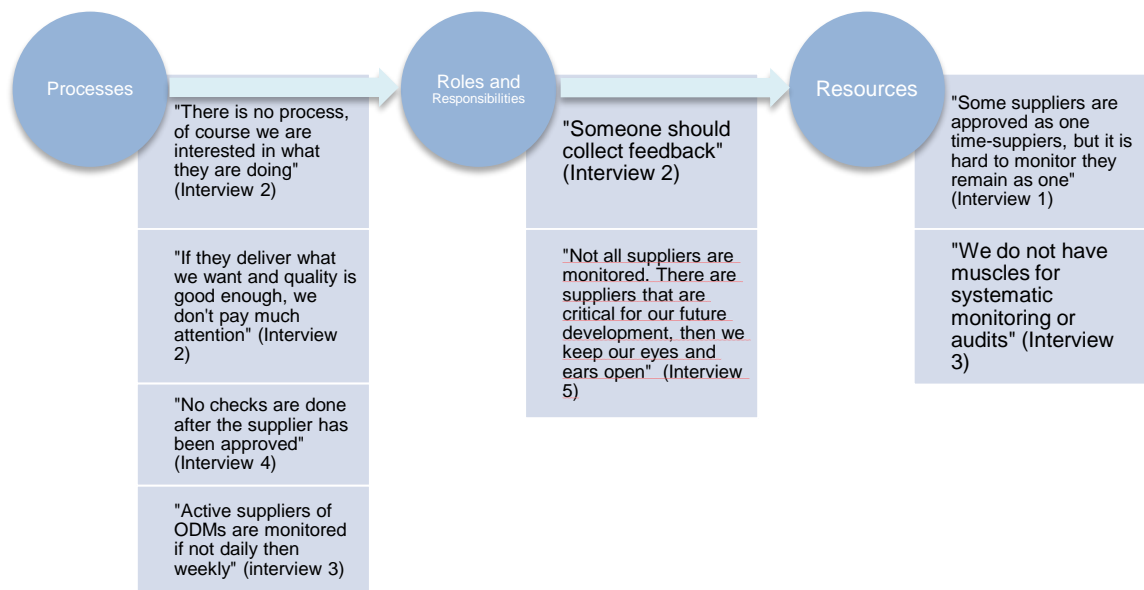


Figure 3-6 Interview Findings Related to Supplier Monitoring

The interviews revealed needs in three different areas: processes, roles & responsibilities and resources. They are all closely linked to each other. As there are no processes, no structured way of monitoring suppliers exist. This leads to the question who is responsible for the monitoring. As common practice in most companies is that procurement takes care of the monitoring, the small sized team finds it impossible to do the work as well as they would like to, especially when they are not in charge of the supplier selection in practice.

It was observed that many teams of the case company might use the same suppliers in different projects, but feedback is not collected systematically. This means even if one team might encounter bad performance the supplier might get used for another project without anyone making sure the supplier has taken corrective actions.

Based on the findings in different phases of the procurement process it must be selected which strengths and weaknesses must be taken into consideration when building the proposal according to the objective of the study. The next subsection discusses the selection in detail.

3.3 Selection of the Findings to Move on With

The CSA was conducted to identify the strengths and weaknesses in the case company operations related to supplier checking and monitoring. The next step is to select the weaknesses most relevant to the business challenge for further development, and identify the related strengths that should be retained.

The high level processes related to sourcing and purchasing have been defined in the case company. For the most part they are followed and the focus of the findings is on the different parts of the process, where the suppliers are somehow checked or monitored.

In the CSA the target was to identify the parts of the sourcing process where suppliers are checked in some way, how the checks are performed and by whom. This means for example checking company background or some other, more general information, about them. The findings were summarized by dividing them into different phases of the procurement process and presented in a fishbone diagram in Figure 3-7 below.

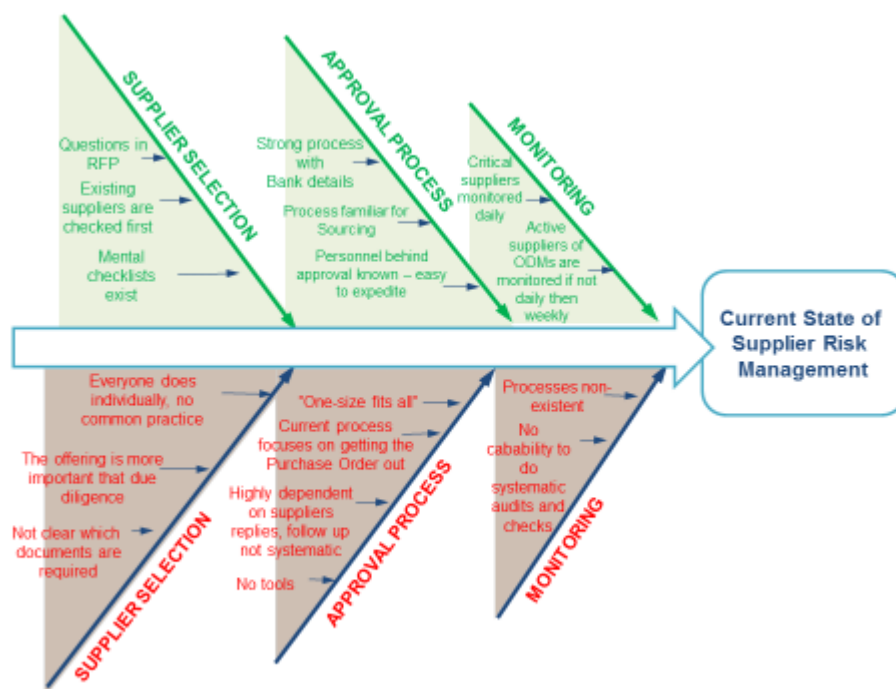


Figure 3-7 Fishbone diagram of the Strengths and Weaknesses

The fishbone shows what was discovered during the interviews. The strengths identified are on the upper side of the arrow and weaknesses on the lower. From these findings, the main strengths and weaknesses are selected and presented in the following Tables.

In supplier selection, processes are non-existent. How suppliers are checked depends on the individual involved. One interviewee felt that business owners should be educated on the fact that they are responsible for the suppliers they are introducing. If they feel they cannot judge the appropriateness of the supplier, they should contact sourcing, who can evaluate the situation and check some important facts. The reputation of the supplier however plays a great role, and existing suppliers are used whenever possible. In order to reach an adequate level of consistency in supplier selection, there should be a check lists available for different requirements.

The new supplier approval process was described in many of the interviews as effective, for most parts. Some steps, like approval of deviating payment terms, were seen as an unnecessary inconvenience that should either be reinforced or dropped.

Monitoring suppliers was seen as missing processes, but many of the interviewees said they do it daily with the supplier they are most engaged with. Critical suppliers are kept a close eye on, even if there are no processes available. It was acknowledged that with the current headcount making audits was not possible.

The biggest strengths regarding supplier checks that were selected to be reinforced are listed in Table 3-2 below.

Table 3-2 Summary of Strengths

STRENGTHS	
Finding	Benefit
Strong process with supplier data	Possibility of fraud is mitigated as suppliers need to confirm their bank details directly to purchasing team
People behind the new supplier approval process are easy to reach	Process can be escalated easily
Experienced employees	Mental check lists exist when bigger deals are negotiated
New supplier approval process is in place	No need to introduce new process, but improve old one

It is evident that as the new supplier approval process exists and is working, it should not be made more complicated. Making more requirements increases the workload of the team managing the approvals and lowers the service levels. Currently strong processes exist with supplier data, making the VMD collection consistent. In case of an urgency the approval process can also be escalated easily as the team is easy to reach. When it comes to supplier selection and monitoring, the experienced sourcing people have their own mental checklists and ways of working, and the benefit of this should be captured by not introducing too heavy processes, but giving the employees helpful tools they can use.

The biggest weaknesses regarding supplier checks are listed in Table 3-3 below, with a description of the impact it has and color code showing how critical the impact is.

Table 3-3 Summary of weaknesses

WEAKNESSES			
Finding		Impact	
1	Rejection criteria/minimum requirements not clear	No knowledge what to demand from suppliers, non-compliant might get selected	
2	No processes for supplier monitoring	Identification of non-performing/no longer compliant/risky suppliers difficult, no audit trail, different criteria depending on the individual	
3	Supplier approval process unclear, requirements are not clear	Non critical suppliers might get unreasonable data requests whereas very critical suppliers might get approved with minimum data	
4	No common practice for supplier evaluation	Different things are checked with similar suppliers – hard to establish benchmark	
5	Supplier data follow-up not systematic	Adding new supplier might take weeks if supplier does not reply to data request	
6	Who is responsible for supplier assessment not clear	Business assumes sourcing evaluates the suppliers, but usually are not given time to do this	
7	Checks often done only after commitment is already done	Case company might end up doing business with unacceptable supplier	
8	No systematic documentation of evaluation criteria	Information about the suppliers weaknesses only on personal computers	

The weaknesses found to be the most important to the business challenge is the lack of common practice in supplier evaluation, uncertainty of the responsibilities and lack of supplier evaluation documentation. Structure is needed to define which of the suppliers

need more investigation before they can be engaged with, and to show business owners what risks they are about to take. Through observations it was noted that if an individual performed due diligence thoroughly, there was no evidence left of it others could access. All data is stored in emails and personal computers. Ensuring that there is documentation available that can be used when the supplier is later monitored enables the evaluator to focus on the issues already identified and see the current status.

The category plans for different sourcing categories are being developed simultaneously to this research as a separate project. After the category plans have been finalized, sourcing will get more control over the supplier selection, and business owners cannot just pick the supplier they prefer the most at that moment. Different sourcing categories, such as professional services, R&D development and IT services, will have their own strategies, which include e.g. selection of preferred suppliers that should be used every time a purchase is needed. This way also the number of new suppliers to be added will reduce, assuming the business remains stable and no new business areas are entered.

Much due to the fact the organization is young and still evolving rapidly, the processes are not mature. For most parts of the supplier management processes have not been documented, but every individual has different methods. While the business focuses its strategy, procurement can improve the processes that are independent of the changes and can easily be scaled up if needed. That is why the focus of this study is on providing common practices to supplier evaluation, helping sourcing do a quick evaluation of the supplier and enabling trail of evidence that can be accessed by others later on.

3.4 Summary of the Current State Analysis

As the CSA revealed multiple issues requiring some resolution the issues must be categorized as ones to be fixed within the remit of this thesis and ones to be fixed in later projects. From the key findings related to supplier risk identification, the ones most related to the objective of the research are selected and existing knowledge on this topic is studied. The key issues selected to be solved are the lack of common practice, unclear responsibilities and the absence of documented risk evaluation everyone can access. The strengths identified and to be reinforced are strong processes related to supplier approval that are in place and experienced individuals, who have extensive amount of knowledge related to working with suppliers.

The CSA was conducted by collecting data in three different formats. The case company employees were interviewed, internal documents were studied and observations of everyday activities were made. The conclusion was made that the immaturity of the case company has not allowed processes to be fully developed, but perfecting the parts of the processes that are not changing even if the business is changing was important to help take the organization to the next level.

According to the CSA the case company capabilities of identifying risks suppliers create require improvement. The focus is on helping the case company employees do this part of the supplier evaluation consistently, quickly and enabling documentation to be created. The next section is therefore dedicated to exploring the existing knowledge and finding best practices in supplier risk identification and evaluation.

4 Best Practice in Supplier Risk Identification

This section discusses the findings from existing knowledge. Ideas and theories from literature, consultancy papers, articles and white papers, related to the issues identified during the Current State Analysis, are presented ranging from general topics to more detailed themes.

4.1 Suppliers Risk Categories

According to Heikkilä et al (2013: 10) already 60-80% of the cost of goods sold (COGS) comes from purchased materials and services and this number is growing. There might be quite a few suppliers contributing to the final product and should one of them fail, the consequences can be anything from minimal to substantial.

Purchasing services is different from purchasing goods. The process is more complex and the risks a buyer faces are different. Also, business services often need to satisfy a large number of people, specifications are hard to make and it is hard to evaluate if the supplier is performing well. (Fitzsimmons et al. 1998: 31) To manage supplier related risks companies must 1) identify and classify the risk, 2) assess the impact and 3) have a risk strategy (Johnson et al. 2011).

Risk management is no longer merely securing a steady flow of raw materials in a manufacturing company. According to Favre & McCreery (2008) for instance in the US approximately 80 percent of the country's economy is services. In order to focus on their core competence, companies outsource many of their important everyday functions, such as payroll and customer service. To ensure smooth operations in the company it is crucial to manage the risks also in the services supply chain (the flow of goods and services from suppliers to customers).

To help risk identification, there are numerous ways of risk categorization presented in literature. For example Johnson et al (2011: 31) state that in supply chain the risks can be categorized into *operational*, *financial*, and *reputational* risk. They define *operational risk* as a risk of interrupted flow of goods or services, meaning the situation where a company does not receive the services or goods it needs to keep the planned production schedule. The reasons for this can be outside the supplier's control, such as weather and

terrorism, but can be a direct result of supplier's own activities. Knowing the supplier's weaknesses, the company can help them in mitigating the risk or prepare themselves accordingly. Understanding also the outside risks helps when making backup plans. *Financial risk* is defined to relate to change of price of the goods and services purchased. For instance, in order to make profit, a company must sell its products with a margin, often a certain percentage added on top of COGS. Often the changes in the price the company pays cannot be transferred to the customers in full, an exception being for instance the gasoline business. Changes in currency exchange rates can increase the prices or give an advantage to a competitor if they have agreed to pay the same supplier in a currency that decreases in value. Another possibility is that the cost of raw materials can change. A company must decide if they wish to agree on fixed pricing, which protects them from a price increase but again can give an advantage to competitors if the price goes down. Having a fixed price can also mean that the supplier might go out of business if they are unable to make a profit of their own. Financial risks also include taxes, tolls and other tariffs that might change the COGS and cost of ownership. The third risk category presented by Johnson et al (2011: 31), *reputational risk*, is characterized as a risk that might be the most severe. Losing reputation can damage a company beyond recovery. Customers might turn their backs on a company if it is caught breaking the law or acting unethically and this often expands also to suppliers it is using. Regaining a good reputation can take a long time and require a lot of resources.

More specified risk categories are presented by Sollish and Semanik (2011: 174). They list the most common categories as follows:

1. Financial risks
2. Scope or schedule risk
3. Legal risk
4. Environmental risk
5. Sociopolitical risk
6. Project organization risk
7. Human behavior risk

Figure 4-1 Supplier risk categories according to Sollish and Semanik (2011)

In this categorization, operational risks are divided into more detailed groups and whereas Johnson et al (2011) consider ethical, environmental and legal risks as reputational risk, Sollish and Semanik consider these aspects as risks even if the public never found out. A separate reputational risks category is not included.

In their categorization Sollish and Semanik (2011: 174) define *financial risk* similarly as Johnson et al., but add the risk of supplier financial troubles. They might go bankrupt and a sudden need to replace the supplier might arise. *Scope or schedule risk* is in this categorization described as poorly defined Statement of Works (SOW) or project descriptions that delay the project and can result in extra costs. Schedules can be ruined by external forces also, such as natural disasters from floods to hurricanes. *Legal risks* arise from e.g. differentiating interpretations of terms and conditions or IP violations. *Environmental risks* include supplier's possibly negative effects on nature. These environmental issues are closely monitored by many governments and different authorities, and may result in significant delays and costs if a supplier is affected. Governments may create challenges also through *sociopolitical* aspect. New regulations might be introduced that require adapting from both the supplier and the company. This risk is significant especially if a supplier is in a foreign country where the company has no visibility through activities of its own. *Project organization risk* refers to a situation where the right people or equipment might not be in right place at the right time, and *human behavior risk* relates to individuals working for the project. Key person might change jobs or get ill and lots of silent information might get lost. Sometimes individuals can also make bad decisions that have negative effects on the company.

If a company uses the same risk management approach on all of its suppliers, the risk is that critical suppliers are evaluated too lightly, and not critical suppliers too thoroughly and time and effort of employees is wasted. Therefore it is important to understand when the risks are most important to identify and act upon. One way to define different approaches for more critical and everyday low-risk purchases is discussed next.

4.2 Tactical and Strategic Sourcing

Purchases can also be divided roughly into two different categories: tactical (sometimes called also transactional or operational) and strategic. Tactical is more traditional, simple purchasing process starting from a request and ending with invoice payment. It is not

well equipped to purchasing services with performance impacts far into future (Heikkilä et al. 2013: 9). A couple of decades ago the focus of supply chain management was on planning the materials requirements, inventory management and price negotiations whereas lately the focus has shifted towards finding competitive advantages from closer cooperation with suppliers (Chandra & Kumar 2000). Where traditional purchasing process is described to focus more on competition between suppliers and gaining competitive advantage through it, strategic purchasing is seen as forming strategic relationships with suppliers so that both can benefit and reach a common long term goal (Park et al. 2010: 496). According to Forker & Stannack (2000: 37) it should however be noted that with some suppliers traditional competitive relationship can be more rewarding and organizations should not waste resources trying to have deep relationships with all the suppliers Figure 4-2 below shows the steps used for shaping the purchasing strategies. According to Park et al (2010) if the supply risk is low, competitive purchasing strategy can be followed whereas high risk requires cooperative strategy.

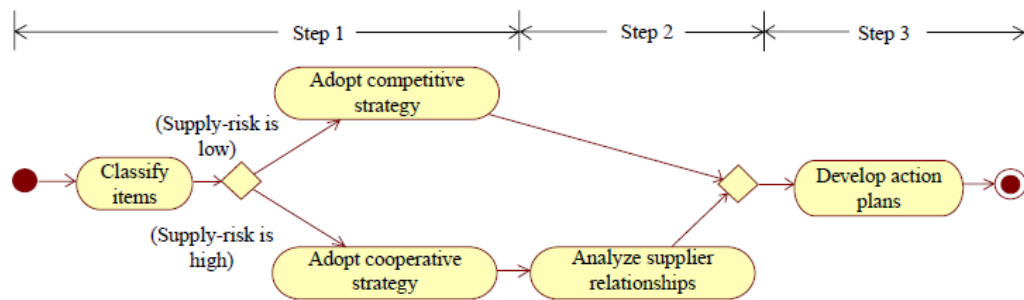


Figure 4-2 An activity diagram of the steps used for shaping the purchasing strategies (Park et al 2000: 500)

When procurement of goods and services is done strategically, it usually follows the typical process steps presented by Novack and Simco (1991) in Figure 4-3.

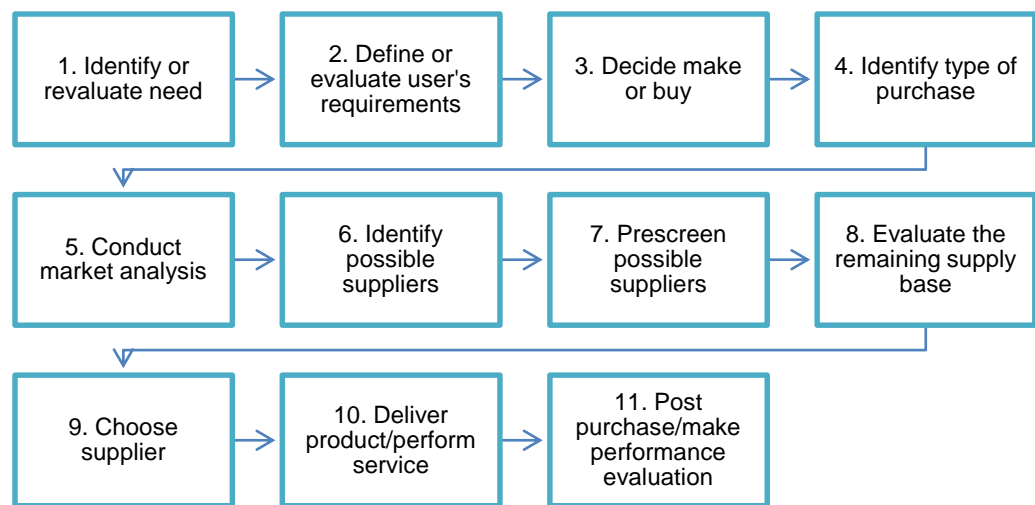


Figure 4-3 Strategic Sourcing Process (Novack & Simco 1991)

This does not mean that all purchases can, or should, be done this thoroughly.

Strategic sourcing can be described as a process, not an isolated decision (Lysons & Farrington 2012) that is more focused on linking the sourcing function to company strategy and includes supplier/contract management. Figure 4-4 below visualizes these two processes.



Figure 4-4 The Strategic and Operational Procurement Processes (Smith, 2012)

When the workload is high and time of sourcing team limited, the focus might naturally shifts towards tactical sourcing where the aim is to satisfy the immediate needs of operations. To avoid neglecting long term strategic planning, it should be considered if strategic and tactical sourcing should have their own designated teams. (Monczka et al. 2011: 174)

4.3 Tools Helping Assess and Manage Supplier Risk

Risk management is used to identify, evaluate, and reduce or eliminate the factors that might have a negative effect on the expected outcome. (Sollish & Semanik 2011: 172-173). Supplier risk management does not mean risk avoidance, but is used to ensure shareholders' assets are protected (Östering 2003: 22). It is for the management to decide if the expected outcome is worth the potential risk. They can decide to either avoid, mitigate, transfer, insure against, limit or explicitly assume risks. (Johnson et al. 2011: 329)

Supplier risk can be looked at in two different ways: there are *inherent* and *residual* risks (ProcessUnity 2014). Inherent risks are the ones that arise from what the supplier is providing for the company. If the supplier is the only manufacturer of a critical component of the company end product, the inherent risk is high. If the supplier is one of the big companies out there providing office supplies, the inherent risk is low. *Residual risk* is what is left when supplier's own controls mitigate some of the risks. For instance an online payment provider has a high inherent risk, but if they have strong internal processes and risk management practices, it might be that the risk remaining is rather low.

When a new supplier is assessed to be added in the approved suppliers list, they are included in an RFP process, or a buyer makes soft market testing, it should be investigated whether they can reliably meet the technical, financial and commercial requirements. Depending on the type of purchase different things should be investigated, but the following ten perspectives should always be evaluated: financial, insurance, capacity, quality, health and safety, environmental management, existing contracts held and performance, organizational structure and key personnel, sub-contracting and procurement capability and supply chain management (Lysons & Farrington 2012: 366-367).

In addition to categorizing possible risks, Sollish & Semanik (2011: 174) argue that the risk assessment should also include a definition whether the risk is *internal*, meaning that the company can control it or *external*, which means it is out of the company's power.

4.3.1 Supplier Evaluation and Selection

When the company needs to decide from where it makes a purchase they need to evaluate the potential suppliers and make a decision. The more critical the purchase, the more thorough evaluation needs to be done.

Supplier evaluation and selection consists of four different stages: defining objective, formulating the selection criteria, qualifying the suitable alternatives, and final selection (Thanaraksakul & Phruksaphanrat 2009). Qualifying can be done through an informal and semiformal evaluation and rating, executive roundtable discussions or formal supplier evaluation and rating (Johnson et al. 2011: 354).

Monczka et al (2011: 262) present the process of creating a supplier evaluation and selection survey in seven steps, visualized in Figure 4-5 below.

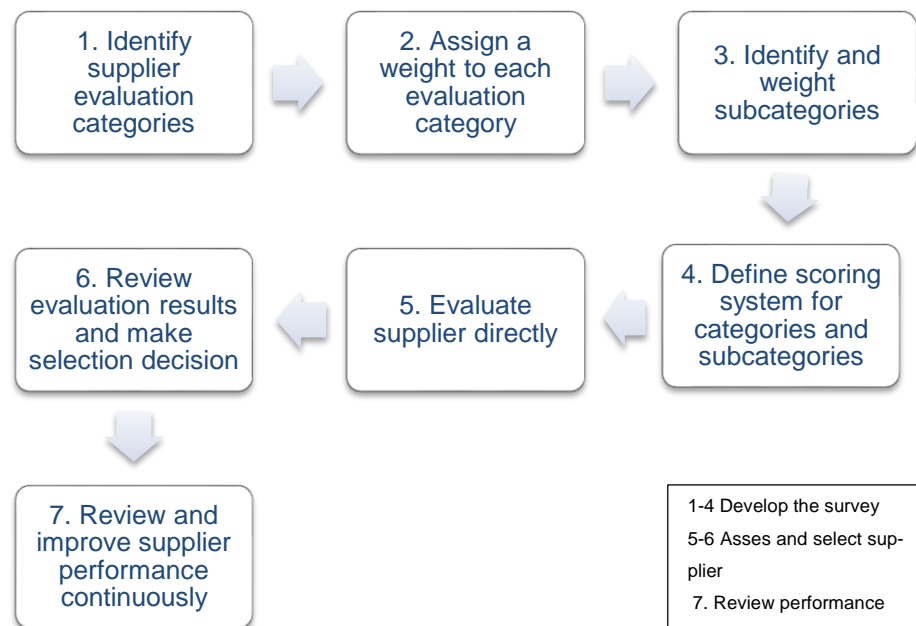


Figure 4-5 Development of a Supplier Evaluation and Selection Survey (Monczka et al 2011)

First, as seen in Figure 4-5, evaluation categories are defined. These are high-level topics that reveal the supplier performance in areas important to buyer. The second step is to assign weight to each category as some performance areas are more important than the other. The third step goes into details of each category by defining subcategories and weighing them. Step four defines the scoring system. It could be for example scores from one to five or one to ten. Important in this step is to clearly outline the differences between each score, so that scoring will be consistent. Next, supplier is evaluated directly by visiting their facilities. This allows the buyer to evaluate some things (for example how modern the production line is) by themselves, and not having to trust the supplier to provide truthful information. Step six is a review of the results and selection making and step seven is monitoring supplier performance according to the criteria used for selecting them.

Traditional supplier key performance indicators (KPI) are price, quality and delivery (Lysons & Farrington 2012: 376). Under these categories, there might be several quantitative variables (Monczka et al. 2011: 317). For instance, price can be evaluated in

many ways, e.g. price against competitors or supplier's real cost can be tracked after adjusting for inflation.

When it is evaluated whether something should be purchased from a specific supplier, the value proposition should be investigated. When doing so, the criteria can be divided into 3 levels: Strategic, traditional and additional current criteria. (Johnson et al. 2011: 136). Strategic criteria investigates whether the need has strategic implications. Traditional focuses on the value proposition of quality, quantity, delivery, price and service. Additional current criteria include financial, risk, environmental, innovation, regulatory compliance and transparency as well as social and political factors.

4.3.2 Supplier Categories

Companies use different types of suppliers. Some of the suppliers are selected to become partners with long term commitment, some are used only once to satisfy a specific one-time need. The monetary value of the relationship does give some clue about the importance of the supplier, but sometimes low value purchases can be critical also.

Suppliers can be ranked from unacceptable to exceptional (Johnson et al. 2011: 357-358). Unacceptable suppliers fail to meet the operational and strategic needs. Sometimes the company is forced to use unacceptable suppliers, for example in a sole-source situation, but long term plans should include a strategy to change them. Acceptable suppliers are easy to replace, but they satisfy the company needs easily. Preferred suppliers are used systematically and processes have been improved to enable effective operations. Both supplier and company work to improve the relationship. Exceptional suppliers anticipate the needs of its customer and this way creates competitive advantage.

Instead of evaluating suppliers one by one, they can be categorized in different groups and potential risks evaluated per category. Lysons and Farrington (2012) propose the following categorization of the suppliers:

1. *Partnership* – a one-to-one relationship with a supplier in which a corporate single-source agreement will be in place.
2. *Preferred* – There is an agreed number of suppliers for one product or service with a corporate agreement
3. *Approved Suppliers* – suppliers have been assessed as satisfactory suppliers for one or more products or services
4. *Confirmed Suppliers* – those that have been specifically requested by a user, such as design or production and accepted by purchasing – the acceptance process being:
 - a) No preferred, partnership or approved suppliers is on the purchasing database for an identical requirement
 - b) There will be no continuing demand for the supplier
5. *One-off Supplier*
 - a) No preferred, partnership or approved supplier is on the purchasing database for identical goods or services
 - b) Purchasing card payment is not appropriate or possible
 - c) Supplier will be closed after transaction is complete

Source: (Lysons & Farrington 2012: 375)

It is evident that not all supplier categories can have the same set of requirements. Companies in the “partnership”-category must be carefully evaluated before trusting them with their status, whereas it would be a waste of time to evaluate the one-off suppliers in the same way, as they probably could not even fulfil specific requirements. Lysons and Farrington (2012) also argue that in general suppliers should be added to approved suppliers list only for a period of one year, and their position should be re-evaluated regularly. If the performance has been good for long, the supplier might get upgraded to the next category, but consistent bad performance would lead to removing the approval.

4.4 Conceptual Framework of Supplier Risk Identification

The Conceptual Framework of this thesis is presented in Figure 4-6 below. It consists of the main themes in existing knowledge studied earlier in this section four.

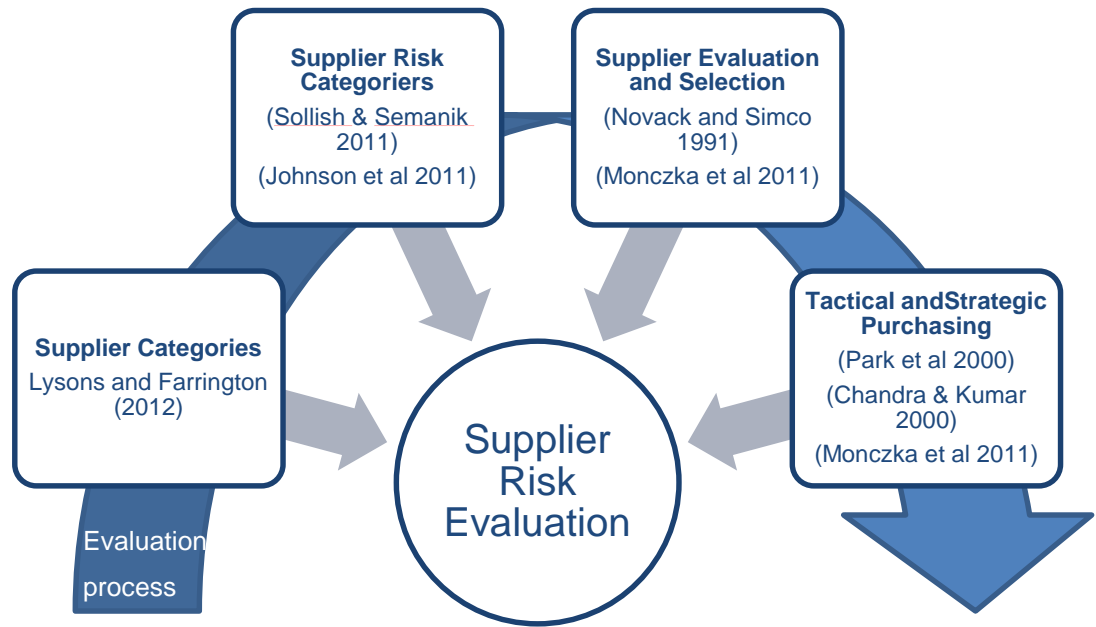


Figure 4-6 Conceptual Framework of Supplier Risk Evaluation

The Conceptual Framework presents important aspects that need attention when creating a Supplier Risk Evaluation tool, presented on a timeline of the preliminary evaluation tool proposal creation process. In the next section, the preliminary proposal is presented to the case company key stakeholders and the proposal building process is described in detail.

5 Building a Proposal for the Case Company

This section merges together the results of the Current State Analysis, the Conceptual Framework and Data collection 2. Based on this data the initial proposal is created. Before presenting the final proposal to the case company, feedback is gathered and the proposal is fine-tuned before moving to validation in section 6.

5.1 Description of the Proposal Building Process

The objective of the research is to provide the case company with a tool for manual supplier risk identification. The Current State Analysis revealed certain strengths and weaknesses associated with supplier evaluation in different phases of the purchasing process. Supplier selection, approval and monitoring each had their own characteristics. For example, supplier selection in the case company is mostly business driven, the approval process is followed appropriately and the criteria for monitoring a supplier is dependent on the individuals involved. The focus for the research was selected to be on the supplier evaluation, as it is the most crucial point for a young company entering new business areas and a supplier approval process was already in place and functioning. Supplier evaluation also gives guidance for future on which suppliers need to be monitored and in what respect.

It was revealed in the Current State Analysis that the case company has no consistent way of evaluating suppliers and identifying, evaluating and documenting risks. It was mentioned more than once in the interviews that it was not clear what the minimum requirement for suppliers is. As it is impossible to have an explicit, all covering list of requirements due to different business cases, helping workers understand the high level risks helps them evaluate the supplier.

After the Current State Analysis existing knowledge was reviewed. This consisted of literature, books and handbooks, articles and white papers. As the challenges identified in Current State Analysis were fuzzy, a wide range of theories on sourcing, purchasing and supply chain management were reviewed and the most relevant ones were presented in section four. Based on these theories a Conceptual Framework on supplier risk identification was created to provide a baseline for proposal building.

As the aim is to create a tool that answers to the needs of the case company, the actual proposal building is initiated with a co-creation session, where the second data collection of this study takes place. Next, this process is explained in detail.

5.2 Development Ideas from Data Collection 2

To provide the case company with a tool they would gladly use, their opinions must be heard before putting too much effort on creating something they would not employ. Therefore case company employees in procurement and legal affairs are invited to participate in a workshop where they can get their opinions heard. The semi-structured workshop took place in March 2016 and due to scheduling challenges the time reserved for the workshop was limited to 90 minutes. The legal representative was unable to participate, but provided input on risks that should be considered when involving a supplier via email.

A PowerPoint presentation was prepared to introduce the case company employees the current state findings and the relevant literature that was used to build the Conceptual Framework on supplier risk evaluation. Furthermore, to enable a quick start of the workshop, a preliminary proposal was formulated and added to the presentation to initiate discussion and to facilitate further development idea production. Figure 5-1 below visualizes the preliminary idea that was presented in the workshop. The preliminary proposal is based on supplier categories (section 4.3.2). As the case company is already using supplier categories shown in the figure, it was proposed that two new categories would be added: partnership and confirmed suppliers.

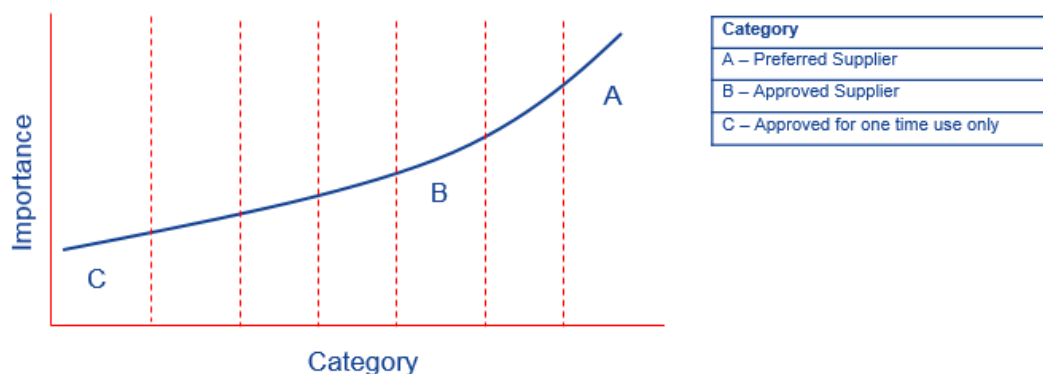


Figure 5-1 Preliminary proposal presented in co-creation workshop

Each of these supplier categories would be given a set of requirements. A set of checks should be performed before suppliers can be added to a specific category. A “supplier lifecycle” would be created and procurement would monitor the suppliers when they are placed in a category. Suppliers would also be required to prove their capabilities in lower categories before they can move to the next level in supplier hierarchy. For instance, the financial status of the supplier should be checked when they enter the “preferred supplier” status, but not when they are approved for one time use only.

The preliminary proposal did not however get an approval from the case company employees as they were hoping to get something more concrete they could use in everyday work. Because the case company has only recently published its strategy and has some incubating business units, they only have a handful of preferred suppliers. In the participants’ opinion, adding the “partnership” category would not serve its purpose at the moment. It was also questioned whether suppliers would really be climbing up in the hierarchy or would they enter higher categories instantly. Also, it was brought up in the workshop, like discovered already in the Current State Analysis, that the case company procurement does not have the resources to evaluate every new supplier or monitor all existing ones. This means making sure suppliers act according to supplier category requirements would be troublesome and eventually lead into discarding the system. And as the case company adds on average forty suppliers to their VMD every month, the risk identification should be easy and not require lots of resources. Therefore, the planning of the tool was started from the beginning, the main focus being on the needs of the case company.

The main comments and requirements that were raised in the workshop are collected into Table 5-1 below. They are categorized in three different categories: format, layout and use cases. All notes from the workshop are attached as Appendix 2.

Table 5-1 Co-creation workshop results

Category	Comment
Format	"To begin with an Excel would be good. If our intranet is able to support online survey, it could be considered in the future"
Layout	"Should quick and easy to use"
	"Colors should indicate where the risk is"
	"Simple scoring: minimal, moderate, high"
Use cases	"For sourcing use"
	"Should be used only with more critical cases"
	"Should be used also with existing suppliers, if new agreement is negotiated"

The tool the case company employees desired was a simple, perhaps Excel-based, checklist that would be easy to fill out and use to get an overview of the risk evaluation. If it was possible, employees would like to see the tool in the company intranet functioning as an online survey, but they understood the timeline of this research did not allow investigation of this possibility and it was agreed this would be left as one of the future development ideas. It was hoped the tool would use simple scoring, for example minimum, moderate, high, and colors would indicate high and low risks. One of the employees provided examples from the corporation's other business unit to be used as benchmark (listed in internal documents Table 2-3).

The employees accepted the theories on tactical and strategic sourcing (discussed in section 4.3) and it was concluded that the strategic sourcing approach, which is applied only to more critical cases whereas low-risk purchases are done using tactical sourcing, could be used when defining the instructions when the tool would be used. The supplier risk categories used in the tool would be the ones presented by Sollish & Semanik in section 4.1.

Discussion on who should use the tool concluded that sourcing should be responsible for making the evaluation and documenting it, but it was acknowledged that the business stakeholder input would often be needed as they are the ones with the needs, are closely involved with the supplier, and suffer the consequences of even the smallest defects in supplier performance.

It was agreed that the researcher would create a proposal of the tool based on the comments provided in the workshop and present it to the key stakeholder when comments were needed. Time constraints created by the research timeline were acknowledged, and it was agreed that only a theoretical tool would be provided and finalized internally by the case company afterwards. In the next section, the proposal creation process is described.

5.3 Proposal Draft Creation

To provide the case company with a tool they need and would like to use, the proposal draft is co-created with the case company employees. The co-creation is initiated with a workshop where the selected stakeholders are presented the findings from the Current State Analysis that was conducted by interviews, internal document analysis and observations. The participants are also briefly presented the relevant topics selected from existing knowledge, and the preliminary proposal on what the tool could be like.

The outcome of the co-creation workshop was not to develop the preliminary proposal further. Instead, it was decided that a tool similar to the ones that had been used by an affiliate was to be created. As the referenced tools were more than ten years old and the business environment the case company currently is in is different, the tool could not be taken into use as is, but could serve as an example during proposal creation. Due to the change in scope, a small scale revisit to literature is required to complement the existing knowledge section and to modify the Conceptual Framework used for the proposal building to reflect reality better, before the actual proposal creation can begin.

5.3.1 Brief Revisit to Existing Knowledge

The workshop held with the case company employees concluded that the case company wanted the proposal to be different from what they were introduced as a preliminary proposal based on the Conceptual Framework formulated in section 4. Instead of creating risk-based requirements for different supplier categories, it was decided that a more high level risk identification tool would be created.

The nature of risk can be defined in two ways. A simple definition is “Risk is the chance of something happening that will have an adverse impact on our objectives”. A more complex definition is “Risk is a measure of the inability to achieve program objectives within defined cost, schedule, and performance constraints.” (Sollish & Semanik 2011: 171)

One part of assessing a risk is considering first the outcome of risk impact and second how likely it is to occur. According to Harland et al. (2003) the questions a company should ask are:

1. How likely (probable) is it that an event will occur?
2. What is the significance of the consequences and losses?

If a risk is very unlikely to happen, it should be acknowledged, but using a lot of resources mitigating the risk might not be wise. A commonly used tool helping to visualize the risk is the probability-impact matrix. According to Cox (2008), a standard 5x5 matrix was developed by Federal Highway Administration in 2006 to assess risk associated with road maintenance and building, and setting priorities. The Risk Matrix for Federal Highway Administration is presented in Figure 5-2. Cox criticizes the matrices being unable to provide trustworthy risk rating, as the transparency is lacking and the definition on how critical the risk is is often subjective. However, he acknowledges that the method is widely used and more research is needed in order to provide a better solution.

	Very low impact	Low impact	Medium impact	High impact	Very high impact
Very high probability	Green	Yellow	Red	Red	Red
High probability	Green	Yellow	Red	Red	Red
Medium probability	Green	Green	Yellow	Red	Red
Low probability	Green	Green	Yellow	Red	Red
Very low probability	Green	Green	Green	Yellow	Red

Source: Cox (2008).

Figure 5-2 Risk Matrix for Federal Highway Administration

Hallikas et al. (2002) conclude that it should be identified which risks are important to a particular company and prioritized, in order to focus resources effectively. The importance should be evaluated with experts of respective fields.

To illustrate how the original Conceptual Framework and additional theory from revisited existing knowledge were utilized in reality, the Conceptual Framework presented in section 4.4 is amended. It can be found in Figure 5-3 below.

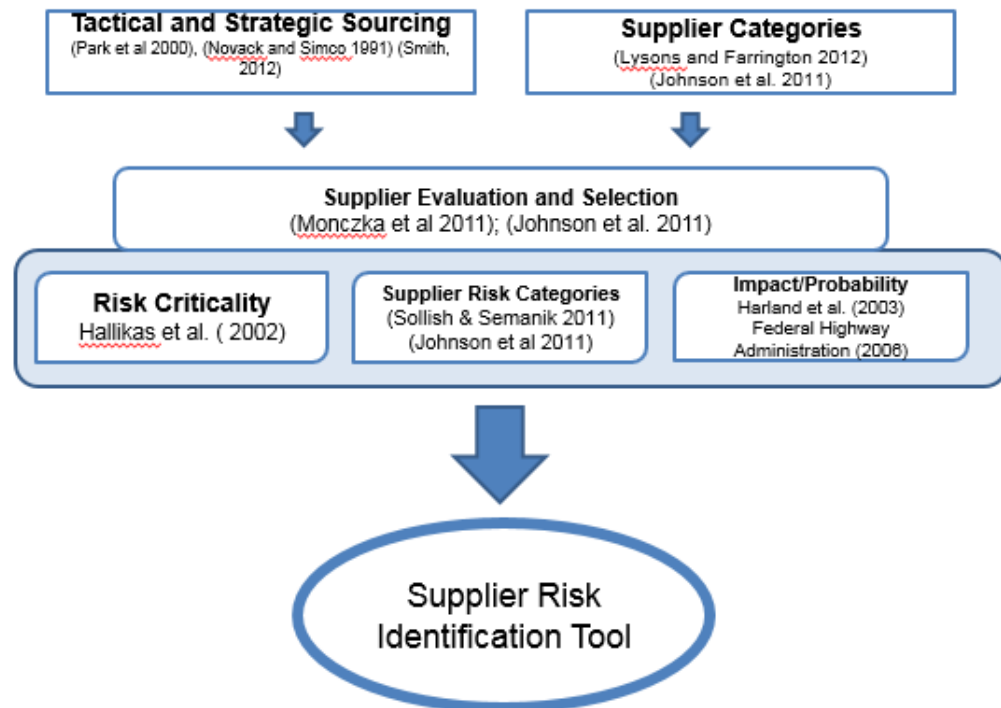


Figure 5-3 Conceptual Framework on Supplier Risk Identification revisited

Different sourcing approaches and supplier categories define the use case for the tool. It is built with theory on supplier evaluation and selection, and different smaller theories help creating the actual content.

5.3.2 Creation of the User Guide Proposal

As the CSA and data 2 revealed the limited resources of the procurement team and problems in timing with some of the processes, the use cases for the tool proposed are defined by giving a guidance based on the definition of tactical and strategic sourcing in section 4.2. The tool is not meant to be used for low value, tactical purchases, but to be used to give an overview of the risk level of more strategic purchasing. The tool is meant to be used in the eighth step of the strategic sourcing process “Evaluate the remaining supply base” (see Figure 4-3). Therefore, the tool is equipped with a “User Guide” which explains in which cases the evaluation should be done.

The user guide includes explanations on what the tool is for, who it is for, when and how the tool should be used and interpreted. Figure 5-4 shows the wording proposed to the case company key stakeholder.

Internal use only

Supplier Risk Evaluation Tool

- The user guide

v. 1.0

This Supplier Risk Evaluation tool is used to identify risks and to give guidance what to take into consideration when engaging a supplier to a critical/high value assignment. Suppliers categorized as "One time supplier" should not be evaluated unless specifically needed.

To get most benefit out of the tool, the evaluation should be performed before the commitment is made. This way risk mitigation can be performed also constructually or supplier can still be changed if necessary.

Summary sheet gives you an overview of the risk identification. It shows score for each risk category. In the summary-sheet, you can see the subcategories, but respective scores are presented in the Risk Evaluation-sheet with the likelihood of the risk actualizing.

ONLY FILL OUT RISK EVALUATION (sheet 3)

Summary (sheet 2) is filled automatically and gives an overview of the risk evaluation results.

Subcategories are revisited as needed, you can find the latest version in intra.

Figure 5-4 Proposed User Guide

The guidance is kept as simple as possible and by bolding the most important parts a quick understanding of the use case is enabled.

After the employees have been explained when the tool should be used, they move to the "Risk Evaluation" sheet. On this sheet they should find a checklist where they can easily get an overview of the level of risk with a particular supplier. In the next subsection, the steps of the checklist creation are explained.

Storing the findings in a place where they are available for all parties involved in the supplier relationship is important for monitoring purposes. Storing the evaluation in per-

sonal emails and computers might result in losing them easily and making them inaccessible if the person in question is not available. Therefore the proposed storing of the evaluations would happen in a repository where also the agreements are archived.

5.3.3 Creation of the Checklist Proposal Draft

The model presented by Monczka et al (2011) (see section 4.2.1) is used as a guide when the proposal of the checklist is created. The model can be used when creating a survey for a more general supplier evaluation, but is now only used for risk identification and evaluation. Next, the draft creation steps and respective actions are explained.

Step 1 - Identify supplier evaluation categories

Suppliers can be a threat to a company in many different ways. There are several categorizations of supplier risks presented in literature. The workshop concluded that the main categories used would be the risk categories presented by Sollish & Semanik, discussed in section 4.2.2. Figure 5-5 presents the first stage of the checklist proposal building.

1	2	A	B	C	D	E	F
	1	Supplier:			Business Owner:		
	2	Project:			Sourcing Manager:		
	3	Date:					
	4						
	5	Financial risks					
+	9						
	10						
	11	Scope or schedule risk					
+	15						
	16	Legal risk					
+	21						
	22						
	23	Environmental risk					
+	26						
	27						
	28	Sociopolitical risk					
+	30						
	31						
	32	Project organization risk					
+	34						
	35						
	36	Human behavior risk					
+	38						
	39						

Figure 5-5 Proposal building step 1

The template building in Excel is started based on the workshop discussion. In addition to the seven risk categories the template also includes basic information about the case in question.

Step 2 - Assign a weight to each evaluation category

The weight for each category is defined by comparing the categories to the one presented by Johnson et al. (2011) (section 4.2.2): financial, operational and reputational. As both categorizations included financial and operational/scope risk, these two are weighed as more important in the tool. Taking into consideration also the business the case company is in, legal risks are given more value. A great deal of the case company business relates to immaterial ownership, and making sure agreements are executed properly to secure the company IP. The remaining categories are weighed equally and the total score is 100.

1	2	A	B	C	D	E	F	G
	1	Supplier:			Business Owner:			
	2	Project:			Sourcing Manager:			
	3	Date:						
	4							
	5	Financial risks		Score:	/20			
+	9							
	10							
	11	Scope or schedule risk		Score:	/20			
+	14							
	15							
	16	Legal risk		Score:	/20			
+	21							
	22							
	23	Environmental risk		Score:	/10			
+	26							
	27							
	28	Sociopolitical risk		Score:	/10			
+	30							
	31							
	32	Project organization risk		Score:	/10			
+	35							
	36							
	37	Human behavior risk		Score:	/10			
+	39							
	40							

Figure 5-6 Proposal building step 2

Step 3 - Identify and weight subcategories

For each of the main risk categories subcategories need to be defined. In this step the expertise of the case company employees must be employed and opinions asked in workshops. As the timeline of this study did not allow definition of the subcategories, Figure 5-7 below shows an example of what the proposal building step 3 could look like.

1	2	A	B	C	D	E	F	G
	1	Supplier:			Business Owner:			
	2	Project:			Sourcing Manager:			
	3	Date:						
	4							
	5	Financial risks		Score:	/20			
-	6	Possibility of change in total cost?						
	7	Negative exchange rate change effects?						
	8	Is the supplier financially stable?						
	9							
	10							
	11	Scope or schedule risk		Score:	/20			
-	12	Business impact if supplier unable to deliver						
	13	Propability supplier is unable to deliver						
	14							
	15							
	16	Legal risk		Score:	/20			
-	17	If the supplier is creating IP:						
	18	Is the company registered as an employee?						
	19	Companys ability to warrant their offering?						
	20	Risk of data leak?						
	21							
	22							
	23	Environmental risk		Score:	/10			
-	24	Supplier has environmental plans						
	25	Supplier uses chemicals						
	26							
	27							
	28	Sociopolitical risk		Score:	/10			
-	29	Supplier has operations in 3rd world countries?						
	30							
	31							
	32	Project organization risk		Score:	/10			
-	33	The size of the company						
	34							
	35							
	36							
	37	Human behavior risk		Score:	/10			
-	38	Dependency on one persons performance						
	39							
	40							

Figure 5-7 Proposal building step 3

The subcategories are to be worded in a way that enables the user to understand what the risk behind the category is. The weigh is determined based on how important the risk is to the case company according to experts.

Step 4 - Define scoring system for categories and subcategories

The workshop concluded, that the scoring should be simple and not require too much consideration. Using numerical scoring was however not desired so the tool itself uses grades *Minimum*, *Moderate* and *High*, but calculates the scores in the background for the final score. The user rates the different categories using three levels, but the subcategories are given a weight that results in a score for the category in question.

The score represents the probability of the risk realizing. In addition to this, the impact is also considered by adding a column where the user is asked if the risk is *Very Likely*, *Likely* or *Not Likely* to actualize.

Step 5 - Evaluate supplier directly

Some of the data can be collected from public sources, but some might need to be requested from the supplier. Sometimes supplier facilities play only a minor role and benefits of a site visit are smaller than the effort that it takes. A background section is therefore added in the tool, which allows the employee to fill out the information giving details about the evaluation process, for instance whether the supplier has been visited or not. This can give the supplier additional credit and gives the ones reviewing the results a sense of reliability.

Step 6 - Review evaluation results and make selection decision

With the aim of enabling easy evaluation of the results and selection of the supplier, visual elements are added to the proposal. It was hoped that the evaluation result would be visual, containing colors indicating the risk levels. It should be possible to get an overview of the risk level with a quick glance.

The last step of the supplier evaluation survey creation process, *Step 6 - Review and improve supplier performance continuously* is considered out of scope of this thesis and therefore excluded from the proposal building process.

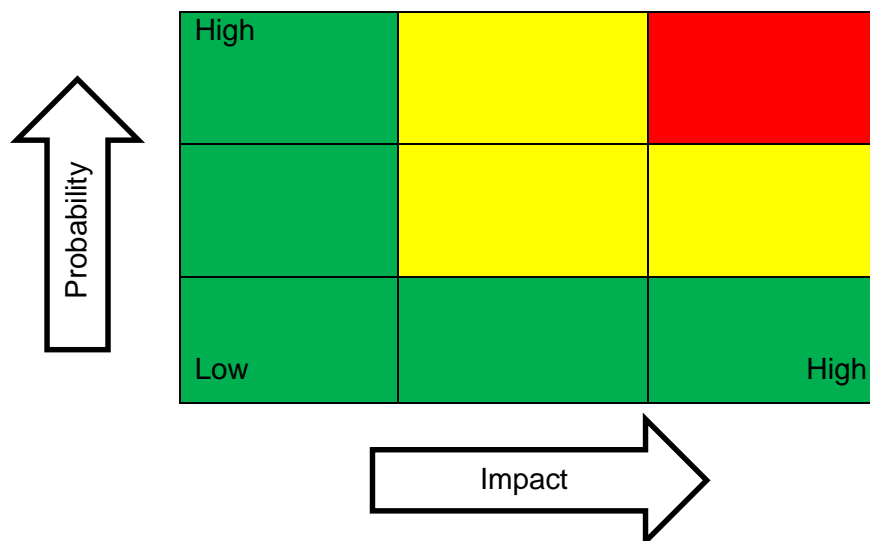
5.4 The Proposal Draft

The initial proposal draft is created based on information gained through the CSA, literature review and a workshop held with case company employees. The creation process follows the supplier evaluation survey creation steps presented in section 4.2.1.

After following the supplier survey creation steps as presented in section 5.3.3, the subcategories and their importance has been defined. However, the requirements from the workshop stated that the tool should be easy to use, visual and not use only numbers as a scoring system. Therefore, another Excel sheet is created to be the one that is used by the case company employees.

The risk categories are presented clearly with respective subcategories and their weights. Probability and Impact columns are given dropdown menus with three different options: low, moderate and critical. Based on the level, selected color coding is automated to draw attention to higher risks easily. The color selection is presented in Table 5-2 below.

Table 5-2 Risk color matrix



If the impact or the probability is low, the risk remains green. But as they get higher the colors start indicating more alarming colors.

Internal use only						
Supplier:		Sourcing Manager:				
Project:		Business Owner:				
Date:						
Category	Subcategory	Weight	Propability	Impact if Actualizes		Mitigation Plan/Comments
Financial risks	Financial instability of the supplier	10	Minimal Risk	Minimal	Low	
	Possibility of change in total cost	6	Moderate Risk	Minimal	Med	consectetur adipiscing elit. Praesent sagittis sodales suscipit. Morbi consectetur non arcu ut maximus.
	Exchange rate changes	4	Minimal Risk	Minimal	Low	
Scope or schedule risk	Change of deliverable during assignment	10				
	Work affected by natural disaster	2	High	Catastrophic	High	
	Need to change suppliers	n				
Legal risk	Supplier adds unauthorized with 3rd party IP to deliverable	n				
		n				

Figure 5-8 Partial screenshot of the proposal

Lastly, the tool is added a column for comments and possible risk mitigation plans. This information might be invaluable when responsibilities in the case company change and a new employee needs to take the responsibility of the supplier relationship.

The proposal and the implementation plan is presented next to the case company key stakeholder to validate it.

6 Validation of the Proposal

This section discusses the validation of the proposed supplier risk evaluation tool. The feedback received from the case company on the proposal is presented and the proposal is amended accordingly to create the final outcome of the study. Lastly, the implementation plan is discussed.

6.1 Findings of Data Collection 3

To validate the co-created proposal it is presented to the case company key stakeholder to get suggestions on final amendments before the tool is presented for implementation. To get the best possible feedback, the validator is selected carefully. The key stakeholder chosen to validate the proposal is working for the procurement department as a manager and owns the case company procure-to-pay process. This gives them the mandate to decide the way the implementation is made, whether the usage of the proposal is strongly encouraged or not. Due to the tight schedule of the research and a sudden business trip of the key stakeholder the proposal draft was sent for comments by email explaining the creation process and planned implementation. The feedback on the proposal draft was also received via email.

The feedback received stated that the proposal had potential. The key informant understood the time limitations, and the implementation plan, which is discussed in more detail in section 6.3, was accepted including the time needed for finalizing the proposal by conducting additional workshops in June-July. One additional idea that was presented in the feedback was to somehow attach the case company's LSSE form to the evaluation tool. LSSE for is a questionnaire used to request suppliers to provide information on for instance their management responsibilities, information security practices and risk management. This way, if a supplier is asked to fill out the form their answers can be easily transferred to the tool without additional effort. This request is taken up and added to the implementation plan.

6.2 Final Proposal

When this thesis project comes to an end, the case company is provided with an Excel-based risk identification tool and a plan how it should be customized to fit the case company needs.

The first Excel sheet includes the instruction for how to use the tool. It reminds the user that they should use LSSE, fill out sheet number 3 and store the findings to the repository the case company has defined. It also includes the location of the latest version of the tool, so that users can download the latest version easily.

Internal use only

Supplier Risk Evaluation Tool

- The user guide

v. 1.0

This Supplier Risk Evaluation tool is used to identify risks and to give guidance what to take into consideration when engaging a supplier to a critical/high value assignment. Low value suppliers categorized as "One time supplier" should not be evaluated unless specifically needed.

If the supplier has filled out the LSSE it can be used as a baseline when identifying risks.

Summary sheet gives you an overview of the risk identification. It shows score for each risk category. In the summary-sheet, you can see the subcategories, but respective scores are presented in the Risk Evaluation-sheet with the likelihood of the risk actualizing.

ONLY FILL OUT RISK EVALUATION (sheet 3)

Summary (sheet 2) is filled automatically and gives an overview of the risk evaluation results.

Please store the filled out tool to [XXXXXX]

Subcategories are revisited as needed, you can find the latest version in intra [hyperlink].

Figure 6-1 The final proposal, sheet 1

Sheet number two holds the executive summary. Using the subcategories and their defined weights the tool will automatically fill out the risk score for each category based on the evaluation on sheet three, and highlights the findings with traffic lights depending on how high the risk in each category is. As the scoring is not finalized the functionality of sheet two is presented in Figure 6-2 only with dummy data.

Internal use only			
SUMMARY			
Date:	0-Jan-00	Sourcing Manager:	John Doe
Supplier:	XXXXXX	Business Owner:	Jane Doe
Project:	nnnnnn		
Date of site visit (if applicable):	na		
			SCORE
Financial risks			6 /20
Scope or schedule risk			2 /20
Legal risk			10 /20
Environmental risk			2 /10
Supplier has environmental policies		Weight	n
Supplier uses toxic chemicals		Weight	n
Sociopolitical risk			3 /10
Project organization risk			6 /10
Human behavior risk			5 /10

Figure 6-2 The final proposal, sheet 2

Sheet number three, presented in Figure 6-3, is the actual tool the user fills out. The data used in the tool is again not using any real data, but only examples to show what it could be like. The tool will indicate the severity of the risk subcategory with traffic lights automatically, based on the Probability and Impact selected from the dropdown menus. Both columns have three options which create a matrix according to Figure 5-2, and the colors defined are green, yellow and red.

Internal use only

Supplier:		Sourcing Manager:				
Project:		Business Owner:				
Date:		LSSE received:				
Category	Subcategory	Weight	Propability	Impact if Actualizes	Mitigation Plan/Comments	
Financial risks	Financial instability of the supplier	10	Minimal Risk	Minimal	Low	
	Possibility of change in total cost	6	Moderate Risk	Minimal	Med	consectetur adipiscing elit. Praesent sagittis sodales suscipit. Morbi consectetur non arcu ut maximus.
	Exchange rate changes	4	Minimal Risk	Minimal	Low	
	Credit risk rating dropping too low					
Scope or schedule risk	Change of deliverable during assignment	10				
	Work affected by natural disaster	2	High	Catastrophic	High	
	Need to change suppliers	n				
Legal risk	Supplier adds unauthorized with 3rd party IP to deliverable	n				
		n				
		n				
		n				
Environmental risk	Negative impact on water, air and so	n				
	Changes in governmental environmental regulations	n				
	Use of hazardous chemicals	n				
Sociopolitical risk		n				
		n				
		n				

Figure 6-3 The final proposal, sheet 3

According to feedback received during the validation a cell asking for the date the LSSE was received is added, to understand if the answers were received from the supplier directly. In addition to this, the questionnaire is also mentioned in the implementation plan provided for the case company as instructions how to customize the tool for their business environment. In the next section, this plan is discussed in detail.

6.3 Recommended Next Steps

The implementation of the tool is simple. First, the tool is customized for the case company by internally defining the risks most relevant to business and then made available for the sourcing personnel.

As the aim is to make the proposed tool really serve the case company in question, the risk subcategories it sees as important need to be defined. As the case company possesses a great amount of expertise related to different risk categories through its employees, a set of workshops is needed in order to define the subcategories and weigh them. It is proposed that the case company would organize two to three workshops during the following months, each focusing on different risk categories. Employees working closely with certain risk categories are invited to participate. The recommendation is that

environmental and sociopolitical risk subcategories are reviewed with the head of corporate responsibility whereas legal risks are to be reviewed with legal councils. For financial risks category the opinions of business control experts should be heard. Subcategories of scope or schedule risk, project organization risk and human behavior risk should be brainstormed with representatives from business lines and sourcing.

The workshops where the subcategories and their weights are defined must be structured. The preparation work include studying the LSSE form and benchmark risk evaluation tool provided by key stakeholder during validation, so that things revealed by the LSSE and model from benchmark are presented to the correct people. Employees must also be instructed during the workshops on how to set the subcategories so that they are easy to understand by any user not familiar with the risk category requirements. Depending on the decisions made in the workshops, different subcategories are added to the tool and weighed to form the first version of the tool. The next step is to introduce the tool to the sourcing department and instruct them on how the tool should be used. During team meetings and workshops the tool can be revisited and improvement ideas collected.

It is also possible that at some point it is realized that for example indirect and direct sourcing require different tools. Then the tool can be split into two, and subcategories relevant for each sourcing category can be defined by sourcing managers.

After the subcategories have been defined in the workshops, taking the supplier risk checklist into use is straightforward. The template can be made available for the sourcing personnel, who are involved in critical purchases, via the case company intranet or team workspace. Sourcing managers are responsible for facilitating the risk identification and they are to store the findings in a location where it can be accessed by others for monitoring the suppliers. This is something the case company needs to instruct, but either a team internal workspace or contract repository could serve the purpose.

The next section summarizes the thesis, evaluates how well it reached its objective, and discusses its reliability and validity.

7 Discussion and Conclusions

This section discusses the results of the thesis. Its practical implications are presented and it is evaluated in its entirety, the main focus being on the outcome and validity of the thesis.

7.1 Summary

This research studies the procurement process of the case company with the aim of understanding how the suppliers are currently evaluated before entering into business with them. The objective was to provide the case company with a checklist to help them identify and document the risks associated with a particular supplier. The current state investigation was done by observations, examining internal documents and interviews with key stakeholders. Interviews were held with all indirect sourcing managers of the case company, all permanent employees of the purchasing department and representatives from direct sourcing and business. Existing knowledge was studied based on the findings from the Current State Analysis and the proposal was co-created with the case company employees to collect information on all their needs and requirements. Finally, the proposal was validated with the key stakeholder who has the power to decide whether the tool is taken into use or not.

The proposal presented to the case company as this thesis project comes to an end consists of two parts. The first part is a user guide that explains when the tool should be used and by whom. The second part is a tool the case company can customize to fit its needs. The tool is created in Excel and includes functionalities requested by case company employees, as well as supplier risk categories and methods to evaluate the risks from existing knowledge.

The case company is also provided with an implementation plan. The implementation plan includes some preparation work to be conducted internally by the case company before the tool can be taken into use as the schedule of the thesis did not allow further development. The tool must be customized to the case company environment with experts from its different departments. According to this plan, the case company can implement the tool after a few workshops where the relevant supplier risk subcategories are identified and added to the tool.

As an extra outcome of this project the case company receives also process charts of its current procurement processes created during the Current State Analysis. These process charts were used already during the thesis project in other development activities and during employee onboarding.

7.2 Practical Implications

The Current State Analysis revealed the case company has no structured ways of identifying and documenting supplier risks, and there is uncertainty who is responsible for it. This means there is a chance no one pays attention to potential risks and the consequences of a supplier failing might be catastrophic. Anything can happen, starting from delayed projects and disrupted production to losing reputation for good. To solve this business challenge a risk identification tool was created.

The main risk categories and the use cases for the tool were defined based on existing knowledge. The risk identification should be done systematically in strategic sourcing and sporadically in tactical purchasing, if there is a need. By collecting all potential risks the case company experts see in the case company supplier networks and putting them into one tool, the employees making the supplier selection are provided with important insights to support their decision making. It cannot be expected that the person looking for a supplier to provide the perfect outcome would be able to identify all risks associated with it when searching for the perfect partner. Trying to gather enough input from different departments on a case-by-case basis would be too time consuming. With the tool, sourcing can easily present the business owners the risk that should be taken into consideration when making the decision. By documenting the findings the main risks the case company faces can be identified and companywide risk management guidelines can be developed.

7.3 Evaluation of the Thesis

The biggest challenges in the thesis project were caused by the limited amount of time. The schedule of the thesis project was tight and the case company environment hectic, keeping employees very busy. This resulted in for example the fact that interviews in data collection 1 were hard to schedule. The goal of having face-to-face meetings had to be let go of and conduct some of the interviews via Skype. For the same reason, the number of interviews did not reach the quantity that was planned in the beginning of the

project. One other weakness is also the validation that was conducted only via email as face-to-face meeting became impossible.

The outcome of the thesis might seem simple and a reader might wonder why such heavy reading is required to create something that seems as evident as the final proposal. It is true that some kind of checklist could have been built in a few hours based on experience alone, but adding theory brings some benefits. Understanding that risk can be categorized in different ways and selecting one example to work with opens eyes to issues not so evident as if the tool had been created with common sense. Creating a survey would also have been non-structured without the guidelines found from literature, and making the distinction between tactical and strategic sourcing might not have crossed the tool creator's mind when defining the use case.

The outcome of the thesis helps an employee to identify and document potential risks presented by a particular supplier. By storing the document properly, the individual can also ensure it is available for other employees involved in the supplier relationship, and potential risks can be addressed sporadically.

Next, the thesis is evaluated in more detail by analyzing how well it reached its objective and how the reliability and validity plan was fulfilled.

7.3.1 Outcome vs Objective

The objective stated in section 1.4 was "*To create a tool that enables the case company to understand the risks created by its suppliers*". The objective was addressed through an Excel-based supplier risk identification tool that helps employees identify risks associated with a particular supplier. The tool was created to help sourcing guide the business owners towards an understanding of when it is important to estimate the level of risk and to see the many aspects to consider when introducing new partners.

When looking at the outcome from word to word, it can be stated that the objective is missing the word "risk" in it when comparing it to the final outcome. But as the topic for this research was developed from the need identified by external consultants, namely lack of risk management approach, the outcome answers to the business challenge.

The objective was to provide a tool for the case company to use, but due to time challenges the proposal presented is only a structure, and requires some customization work

in order to implement it. Finalizing the tool requires workshops with representatives from different departments and being able to book the time can take a while. The tool created was not the only outcome of the project. The case company was also provided with process charts of their processes that were created during the CSA. The process chart of adding a new supplier (Figure 3-5) is already being used by the purchasing team as part of instructions provided for new purchasers, and the swim lane chart of procurement process (Figure 3-1) has been used by consultants hired to develop it.

7.3.2 Reliability and Validity

The reliability and validity plan for this thesis was discussed in section 2.4. Next, the plan is revisited to evaluate how the plan was executed throughout this thesis.

Different methods have been used to construct validity. *Multiple sources of evidence* were used, including interviewees, internal documents, observations, workshops. Every interviewee was provided with the interview recording and transcripts after the interview for review and corrections. A *Chain of evidence* was created by making sure the reader knew where the information was collected from. This was ensured e.g. by presenting key findings in different Figures and Tables. During validation the case company key *stakeholder reviewed the draft* of the thesis as the time limitations prevented trial usage of the tool. This makes the validation weak, but as strong as possible given the circumstances.

With the aim of conducting data analysis that has established internal validity, interviews were conducted with the employees involved and responsible for new supplier evaluation and maintaining VMD. In other words, employees who know different aspects of the issue that was studied were involved. This enabled an evaluation of a *rival explanation*. *Pattern matching* was done not only for different interview transcripts, but the findings were compared to information collected from internal documents (e.g. comparison of procurement process in theory and in reality) and notes taken while observing the case company operations. Due to the low number of research interviews with the case company employees, it could be argued that internal validity has not been reached as well as it could have. It is true the number of interviews in data collection 1 could have been higher to ensure the reader can trust the findings, but due to the low number of employees involved in this area, it was concluded that all necessary aspects were taken into consideration. Additional criticism can be presented due to the fact that the research leans much on the observations of the researcher and the findings can therefore suffer

from researcher bias. The time available for the workshop in data collection 2 can also be considered as a weakness.

By defining if the study's findings can be generalized external validity is created. In this thesis the business challenge studied is very common, but finding an identical situation in other companies is most probably impossible. However, the proposal building can be done in other environments also, and issues relevant to a particular organization can be addressed easily.

Reliability, meaning the ability for other researchers to conduct the same study with similar conclusions is created by documenting carefully the steps and using several internal validity methods. The semi-structured interviews were recorded and transcripts were created. The case company processes are however changing rapidly, which was seen also during this project. And as the case company had no processes in place regarding the topic, different individuals might have different points of views, which can directly affect the interview responses. However, as the key stakeholder represented the sourcing function and the proposal was developed for them, any researcher can arrive at the same conclusion, provided that the organization has not changed remarkably.

All in all the thesis serves the case company as a well-structured study of the current state with a suggestion for structured supplier risk identification approach. Despite the small weaknesses it can be used as a reliable and valid reference when developing other processes in the future.

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Research Interview Template (Discussion)

TOPIC: Case 'Supplier Risk Management through a Profiling Tool'

Information about the informant (Interview 1)

Table 1

Details	
Interviewers	
Name (code) of the informant	Informant n
Position in the case company	
Date of the interview	.XX.XXXX
Duration of the interview	
Document	Field notes

Field notes (Interview 1)

	Topic(s) of the interview	QUESTIONS	FIELD NOTES
1	Starting point: the interviewee describes his/her experience in view of the topic/problem	How often do you work with/source new suppliers?	
		What things are checked when they are evaluated?	
		How many suppliers are somehow monitored (after they are approved) currently and how? How they are selected? If none, should some be?	
		Do you have any tools available?	
		Do you have time to do this/who should do it in your opinion?	
2	Identify strengths/problems	What are our strengths regarding new Supplier Approval and monitoring?	
		What are weaknesses?	
3	Key concerns	What are your biggest concerns if things go as currently?	
		Have you had any specific bad experiences?	
4	Analysis	How the current practice was established?	
		How situation could be improved?	
6	Development needs	How would you change things?	
		What is the most critical thing to fix?	

Table 2

NOTES FROM DATA 2 COLLECTION WORKSHOP

Date: 5.4.2016

Duration: 90 min

Participants: Head of Sourcing, Purchasing Manager, Purchaser, Purchaser, Sourcing Manager (partly)

Format

Excel to start with, maybe in the future a quiz in intra

Who uses

In the future it could be available for everyone requesting a new supplier, but to start with, only Sourcing with mode critical suppliers

Ideas for the tool

Should be used to document that risks have been evaluated

It should capture the probability of the financial risk

It could ask more questions if one questions is answered a certain way

Colors should indicate bigger risks

Scales from 1-5 how likely the problem is to occur

Used to document that risk have been evaluated and someone has decided to take them

Should focus on more critical suppliers, not one time

Should not be too heavy

The fact that supplier has been used previously, should not be reason they are used again

To be done only with Strategic Sourcing

Current supplier categories work well enough, no need to change them

Should take into consideration how long we will be using the supplier

No resources the evaluate every supplier, focus on strategic

Suggested next steps

Business Justification form needs to be updated

Too much info in Supplier data request